

APR 11 1947

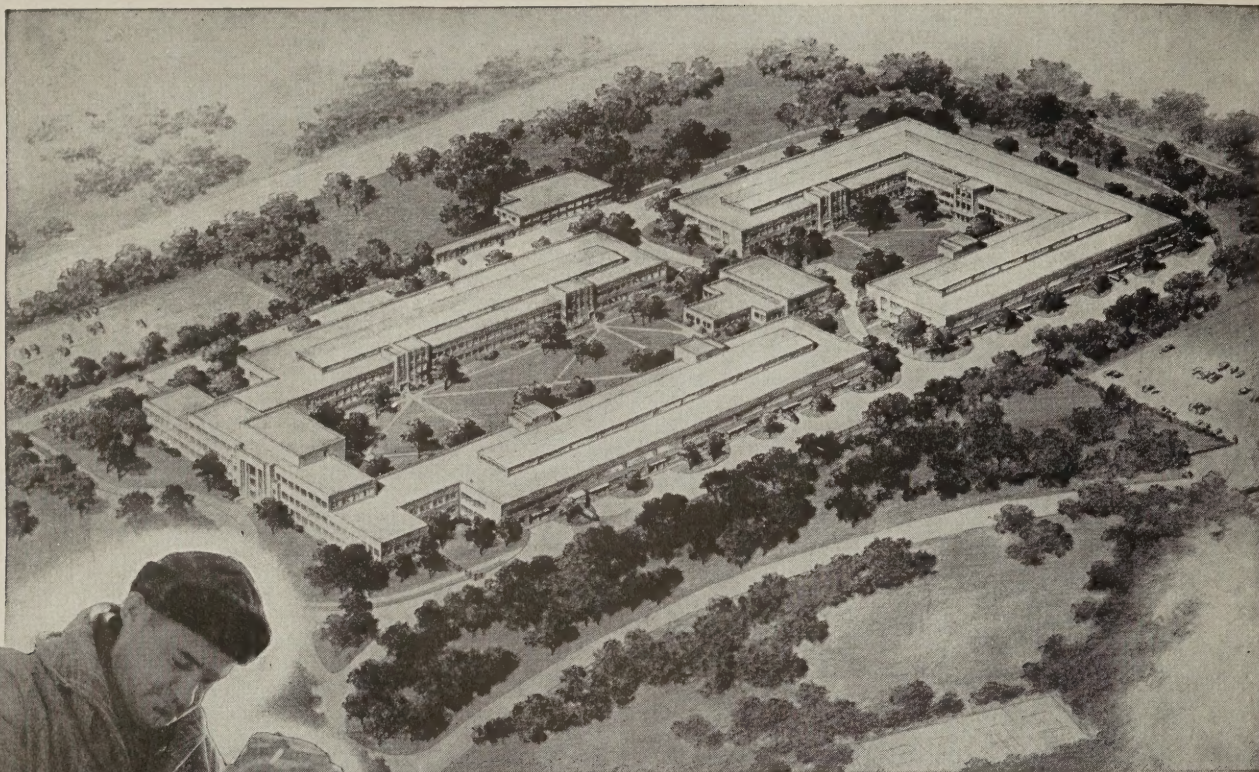
Johns-Manville

PRODUCTS

INDUSTRIAL



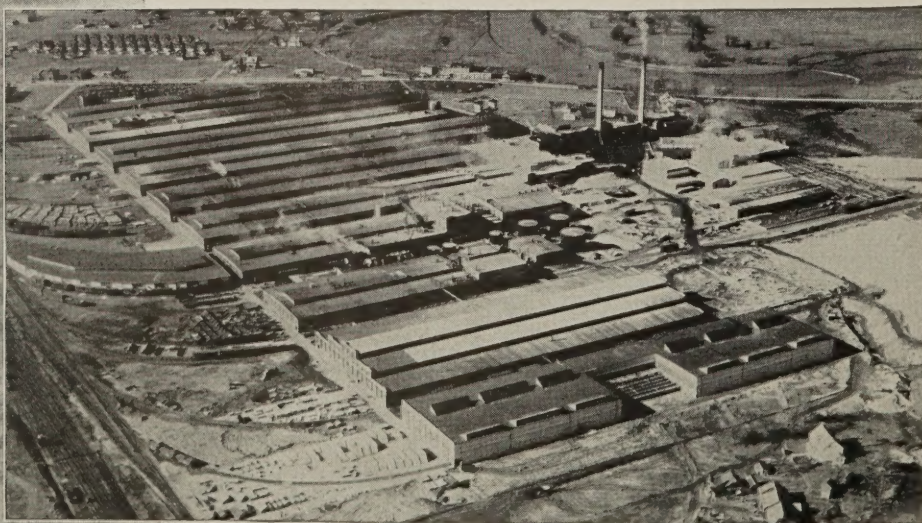
	PAGE
<i>Insulations</i>	<i>3</i>
<i>Refractory Products</i>	<i>16</i>
<i>Transite Pipe</i>	<i>18</i>
<i>Packings</i>	<i>22</i>
<i>Friction Materials</i>	<i>26</i>
<i>Building Materials</i>	<i>28</i>
<i>Electrical Materials</i>	<i>37</i>



RESEARCH: Above is the new Johns-Manville Research Center near Bound Brook, N. J. When completed, this project will be the world's largest Research Center devoted to developing, testing and improving building materials, insulations, refractories, packings and allied asbestos products.

MINE: At left, extracting crude asbestos at the Johns-Manville Asbestos, Quebec, mine. This, the largest asbestos mine in the world, is the source of asbestos fibre used in many Johns-Manville products.

FACTORIES: Johns-Manville Industrial Products are produced in 14 strategically located plants. Shown below is the J-M plant at Manville, N. J.



Industrial Products

Sheet and Block

A COMPLETE INSULATION SERVICE FOR EVERY INDUSTRIAL NEED

The science of industrial insulation may truly be said to have had its inception in the modest factory, built in 1858, which was the forerunner of the present world-wide Johns-Manville organization.

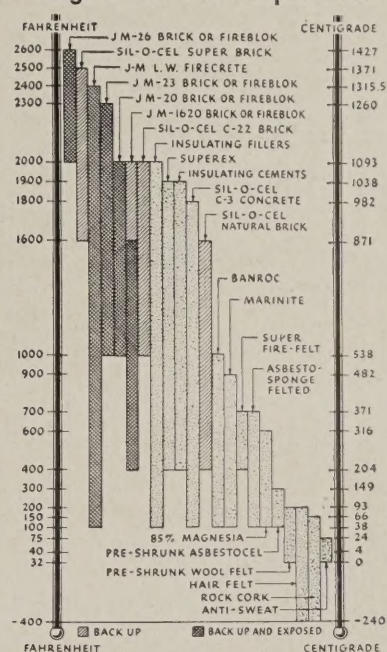
There the earliest asbestos insulations were made, crude products in cement form for covering boilers and steam pipes. From that humble beginning, the science of insulation has developed until now it is conservatively estimated that J-M Insulating Materials save American Business over \$500,000,000 annually through lower fuel costs.

From five mineral products Johns-Manville produces its wide variety of insulating materials. They cover the wide range from -400 F to +2600 F. These materials are available in various forms to meet the many service conditions encountered.

Recognizing that the finest insulating materials made cannot be effective unless properly installed, Johns-Manville has established skilled construction units located throughout the country. Regardless of the type or size of your job these insulation applicators are equipped to offer you a superior insulation service.

And, trained Johns-Manville Insulation specialists, plus the facilities of the J-M Research Laboratory, are also available to help you with your particular heat or cold insulation problems, regardless of how complex they might be.

J-M Insulations Cover the Entire Range of Industrial Temperatures



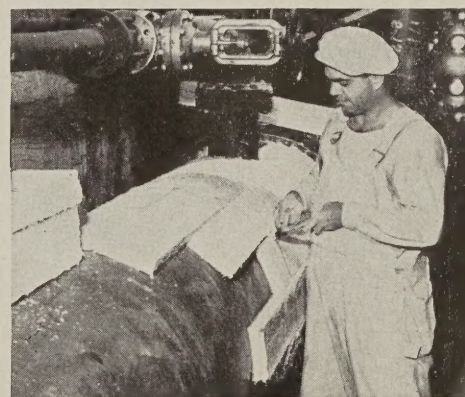
85% MAGNESIA BLOCKS

For temperatures to 600 F.

DESCRIPTION—Made of hydrated basic carbonate of magnesia bonded with asbestos fibre, it is the most widely used insulation for temperatures to 600 F. Maximum number of voids or minute dead-air cells increases its natural resistance to heat transmission and reduces its weight.

USE—Particularly adapted to conditions requiring high insulating qualities and light weight or where it is necessary to use a material easy to cut and fit.

Size	Thickness	Weight
3, 6, 9, 12 in. wide and 18 and 36 in. long, flat or curved. Other sizes on special order.	1 to 4 in. thick. (curved block minimum 1 1/4") (9" and 12" block minimum 1 1/2")	Approx. 1.1 lb per sq. ft. per in. of thickness.



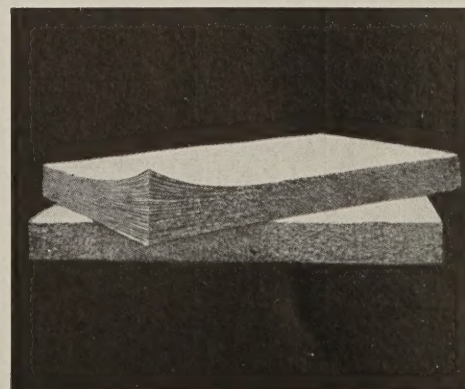
ASBESTO-SPONGE FELTED SHEETS AND BLOCKS

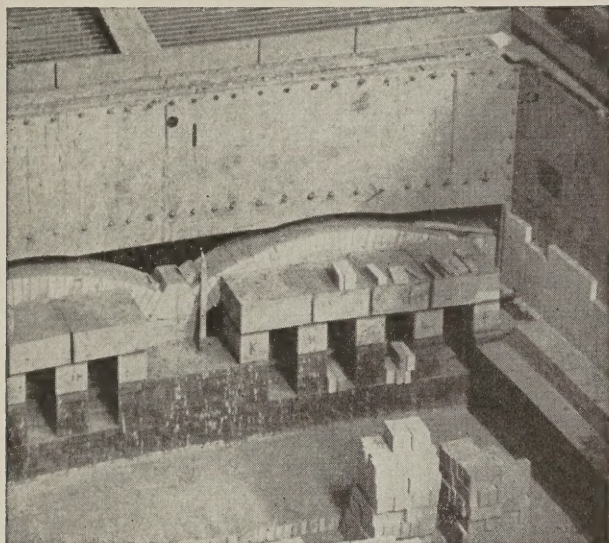
For temperatures to 700 F.

DESCRIPTION—The tightly laminated construction of tough asbestos felts and the many surfaces interposed in the path of heat flow are responsible for its immunity to the effects of vibration, shock and rough handling. It has unusually high salvage value and sustained high insulating effectiveness in service.

USE—Recommended for maximum insulating value and durability in outdoor or indoor service.

Size	Thickness	Weight
Sheets 24 x 36 in. Blocks 6 x 36 in.	From 1/2 to 4 in. thick.	Approx. 3 1/2 lb. per sq. ft. per in. of thickness.





SUPEREX BLOCKS

For temperatures to 1900 F.

DESCRIPTION—Made of calcined diatomaceous silica bonded with asbestos fibre producing an insulation that combines high heat-resistance with exceptional insulating qualities.

Superex Blocks will safely withstand temperatures up to 1900 F. with negligible shrinkage. They are light in weight. Their large-size means fewer joints and quicker application.

USE—Widely used for boiler furnaces, hot blast stoves, mains and bustle pipes, open hearth regenerators, rotary cement kilns, brick kilns, glass tank regenerators, metallurgical furnaces of various types, producer gas mains, petroleum cracking furnaces and other equipment operated at high temperatures.

Size	Thickness	Weight
3, 6, 9, 12 in. wide and 18 and 36 in. long, flat or curved. Other sizes on special order	1 to 4 in. thick. (Curved block minimum 1 1/4") (9" and 12" block minimum 1 1/2")	Approx. 2 lb. per sq. ft., per in. of thickness.

SUPEREX COMBINATION

For temperatures above 600 F.

DESCRIPTION—Superex Insulation is often used as an inner layer in combination with other Johns-Manville materials, such as 85% Magnesia or Asbesto-Sponge Felted, to combine the greater insulation efficiency of these materials with the high heat resistance of Superex. In this construction, Superex is used as protection for the other insulation which, although high in insulation value, is comparatively low in heat resistance.

Proper combination and thickness are dependent not only on the temperatures involved but also on the kind of fuel, its cost and degree of temperature control required. Application over furnace brick work adds still another factor—the type and thickness of the refractory—which must also be taken into consideration.

Recommended combinations and thicknesses, applied on metal surfaces, are shown in table at lower left.

USE—For waste heat flues, fans, steam generating plants and similar equipment where the temperature range is from 600 to 1600 F. Above this temperature Superex is used alone.

MARINITE

Type "A" for temperatures to 900 F.

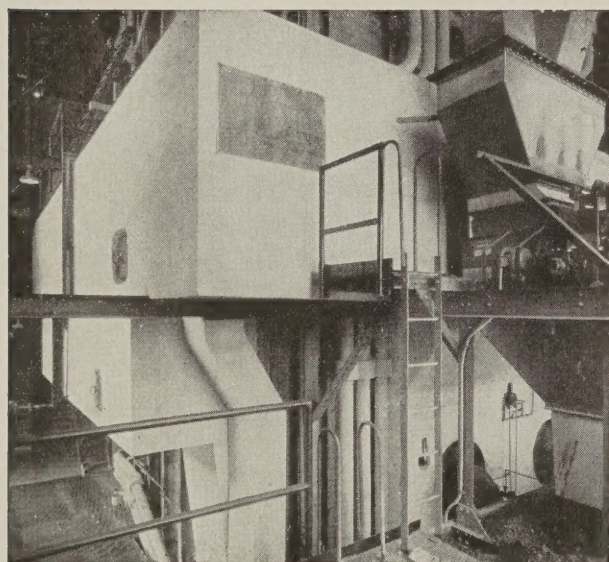
Type "B" for temperatures to 250 F.

DESCRIPTION—Marinite is a solid sheet material made of asbestos fibre with an inorganic binder. It is a combination structural material and insulation, light in weight, fireproof and weather resistant. Type "A" is furnished plain; Type "B" is furnished treated, providing a ready-primed surface for painting.

USE—Because of its low thermal conductivity and high structural strength, Marinite provides economical construction for ovens, driers, housings for walk-in driers and core ovens, or tunnel type of oven or lehr. It is equally suitable for a large variety of industrial uses such as heat shields to confine high temperature air and shields around hot equipment such as involved in welding operations, insulation of crane cabs and fire pits in steel mills, etc.

When properly applied, Marinite offers protection from the detrimental effect of high temperature on the strength of steel where load-bearing members, such as beams, girders and columns are enclosed with this efficient fireproofing material. For Application Specifications consult nearest Johns-Manville office.

Size	Thickness	Weight
36, 42 and 48 x 96 in. and 48 x 120 in.	1/2, 3/4, 7/8 and 1 in.	Approx. 3 lb. per sq. ft. per in. of thickness.



Recommended thickness of block insulation on metal surfaces

Maximum temperature on Superex deg. F.	Thickness of Superex, in.	Thickness of Asbesto-Sponge Felted or 85% Magnesia, in.	Total thickness of block insulation, in.
300	.....	2	2
400	.....	2 1/2	2 1/2
500	.....	3	3
600	.....	3 1/2	3 1/2
750	1 1/2	2 1/2	4
900	2*	2*	4
1000	2 1/2*	2*	4 1/2
1200	3 1/2*	1 1/2*	5

*Where Asbesto-Sponge Felted is used as the second layer at operating temperatures of 750 to 1000 deg. F., the Superex may be 1/2 in. thinner and the Asbesto-Sponge Felted 1/2 in. thicker than shown above.

Sheet and Block

SUPER FIRE-FELT SHEETS AND BLOCKS

For temperatures to 900 F.

DESCRIPTION—Super Fire-Felt is made of felted asbestos fibres. It is light in weight and resilient.

USE—For lining boiler tube doors and the air passages on air-cooled furnace walls. Used where insulation may be subjected to vibration or to strains of expansion and contraction.

If Super Fire-Felt is supported between metal sheets or brick lining and steel shell, temperature limit is 900 F. If less effectively supported, or subjected to removal or replacement, temperature limit is 700 F for normal service and 500 F if subjected to excessive vibration.

Size	Thickness	Weight
Sheets 24 x 36 in. Blocks 6 x 36 in.	½ to 4 in.	1.7 lb. per sq. ft. per in. of thickness.

ASBESTOS BLANKETS

For temperatures to 950 F.

DESCRIPTION—Asbestos fibre filled asbestos cloth envelopes, wire tufted.

USE—For insulating irregular surfaces where readily removable insulation is desired, such as paper digester shells and steam turbines.

How Furnished	Recommendations
Single or double layer construction, 1½ to 2½ in. thick in sizes required.	Furnished on receipt of details.

Also furnished in 3 ft. sections for piping. Recommendations for thickness and grade of cloth furnished on application.

BANROC BLANKETS

For temperatures to 1000 F.

DESCRIPTION—Made of Banroc (mineral wool) felted between various types of metal fabric, asbestos paper or other finishes.

USE—For insulating ovens, driers, oil refinery equipment and for similar purposes.

Size	Thickness	Weight
24 in. wide by 48 and 96 in. long.	1 to 6 in.	Approx. 1 lb. per sq. ft. per in. exclusive of fabric.

ASBESTOS ROLL FIRE-FELT

For temperatures to 1000 F.

DESCRIPTION—A soft, flexible asbestos felt.

USE—For insulating heated surfaces where space does not permit thicker or more rigid forms of insulation.

Size	Thickness	Weight
3 ft. wide in rolls containing approx. 100 sq. ft.	½ and ¾ in.	Approx. 1.2 lbs. per sq. ft. ¼ in. thick.

ASBESTOCEL SHEETS AND BLOCKS

For temperatures to 300 F.

DESCRIPTION—Made of alternate plain and corrugated asbestos felts built up to various thicknesses.

USE—For low pressure boilers, feed water heaters and warm air ducts.

Size	Thickness	Weight
Furnished standard in 4 plies per in. of thickness, in sizes 6, 9, 12, 18 and 36 in. wide by 36, 48, 72 and 96 in. long.	½ to 4 in.	Approx. 1 lb. per sq. ft. per in. of thickness

Fine-corrugated material with 6 plies per in. is also available.

ASBESTOS PAPER

USE—Recommended where an insulating material of minimum thickness is required.

Size	Approx. thickness** in.	Approx. weight* per 100 sq. ft. lb
In widths of 18", 24", 36" to 37½" and 72" in rolls weighing 25, 50 and 100 lbs.	0.015 0.019 0.022 0.027 0.029 0.032 0.0625	6 8 10 12 14 16 32

May be ordered in other widths or in cut sheets or in other weight rolls.

*Actual weights may vary $\pm 10\%$

**Actual thickness of paper may vary $\pm 0.003''$.

ASBESTOS ROLL BOARD

USE—Used where a slightly heavier insulating material than Asbestos Paper is required.

Size	Approx. thickness* in.	Approx. weight** per 100 sq. ft. lb
In widths of 18", 36" and 72" in rolls weighing 25, 50 and 100 lbs. Special widths up to 36".	⅜ ½ ⅝	48 64

Furnished in cut sheets to required dimensions on order, also in other widths and weight rolls.

*Actual thickness of Roll Board may vary $\pm .02''$.

**Actual weight may vary $\pm 10\%$.

ASBESTOS SHEET MILLBOARD

*For maximum temperatures of 400 F. up to 1800 F.

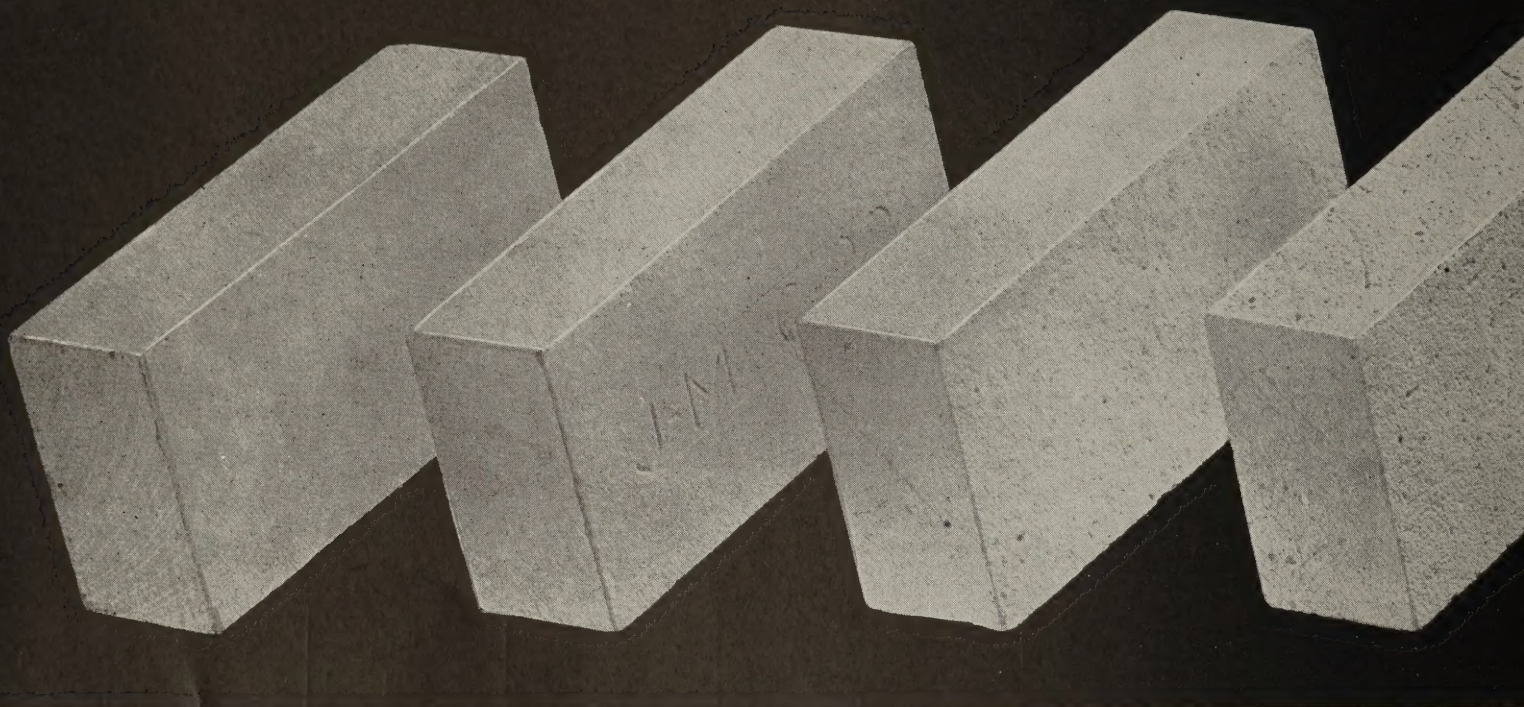
USE—Recommended for general uses requiring a sheet or board for protection against fire, heat, acid fumes etc. Frequently used as a fireproof lining for floors, partitions, ceilings, elevator shafts, ranges, stoves, grates etc.

Note—Millboard can be cut with shears to any size desired and fastened with nails or screws.

Size	Thickness, in.	Per sheet, 42" x 48"; lb	Tolerances Inches \pm
Standard sheet is 42" x 48"; also furnished in cut pieces	⅛	2.5	.007
	⅜	3.5	.008
	⅜	4.6	.008
	⅜	6.0	.008
	⅜	7.0	.009
	⅜	9.0	.014
	⅜	11.3	.015
	⅜	13.3	.016
	⅜	17.6	.025
	⅜	21.4	.029
	⅜	25.2	.034
	⅜	32.5	.045
	⅜	40.0	.057
	⅜	46.6	.068

Actual weights may vary $\pm 10\%$.

*Asbestos Sheet Millboard is furnished in 8 grades for maximum temperature conditions varying from 400 F to 1800 F. "Glassworkers Millboard" available on special order in six grades.



Sil-O-Cel Natural
Insulating Brick

Sil-O-Cel C-22
Insulating Brick

Sil-O-Cel Super
Insulating Brick

JM-1620 Insulating
Fire Brick

SIL-O-CEL INSULATING BRICK

For temperatures to 2500 F.

DESCRIPTION—Sil-O-Cel Insulating Brick are made of diatomaceous silica, a material composed of myriads of tiny dead-

air cells which offer maximum resistance to heat flow.

USE—The three Sil-O-Cel Insulating Brick are recommended as back-up behind a refractory lining, particularly when high load bearing characteristics are required.

Note—All Sil-O-Cel Insulating Brick are furnished accurately sized in all standard 9 in. shapes of the 2½ and 3 in. series as well as in special sizes.

Properties	Sil-O-Cel Natural	Sil-O-Cel C-22	Sil-O-Cel Super
Density—lb per cu. ft.	30	38	40
Transverse Strength—lb per sq. in.	140	115	90
Cold Crushing Strength—lb per sq. in.	400	700	300
Linear Shrinkage—Percent	1.4 @ 1600 F	0.8 @ 2000 F	2.0 @ 2500 F
Reversible Thermal Expansion—Percent	0.1 @ 1600 F	0.7 @ 2000 F	1.29 @ 2000 F
Conductivity at Mean Temperature	††		
500 F	1.01	1.67	1.70
1000 F	1.13	1.88	1.95
	1.24	2.08	2.19
	.....	.....	2.45
Recommended Service	1600 F	2000 F	2500 F
Back Up	.....	.....	.....
Exposed	.....	.....	.....
Recommended Mortar for Setting Brick	Sil-O-Cel Mortar	Sil-O-Cel Mortar	Sil-O-Cel Super-Brick Mortar
Weight per standard 9 x 4½ x 2½ in. straight brick	1¾ lb	2¼ lb	2¼ lb

Above tests are in accordance with ASTM tentative standards.

Conductivity is expressed in Btu in. per hr per sq. ft per deg. F. at the designated mean temperatures.

††—with heat flow parallel to brick strata.

1—with heat flow perpendicular to brick strata.

Packed in fibre cartons of twenty-five 9 in. straight brick or an equivalent volume of other sizes.

The temperature limits given for back-up insulation refer to the actual temperature on the hot face of the insulation, not the maximum operating temperature of the furnace. A brick having a temperature limit of 2000 F may be used as a back-up in furnaces operating at temperatures over 2000 F due to temperature drop through the refractory lining.

SERVICE RECOMMENDATIONS

Annealing Furnaces
Bake Ovens
Billet Heating Furnaces
Boiler Walls
Braze Furnaces
Bustle Pipes
Ceramic Kilns
Carburizing Furnaces

Case Hardening Furnaces
Calorizing Furnaces
Combustion Chambers (Domestic Oil Burners)
Core Ovens
Die Casting Machines
Drawing Furnaces
Electrolytic Cells (Magnesium)

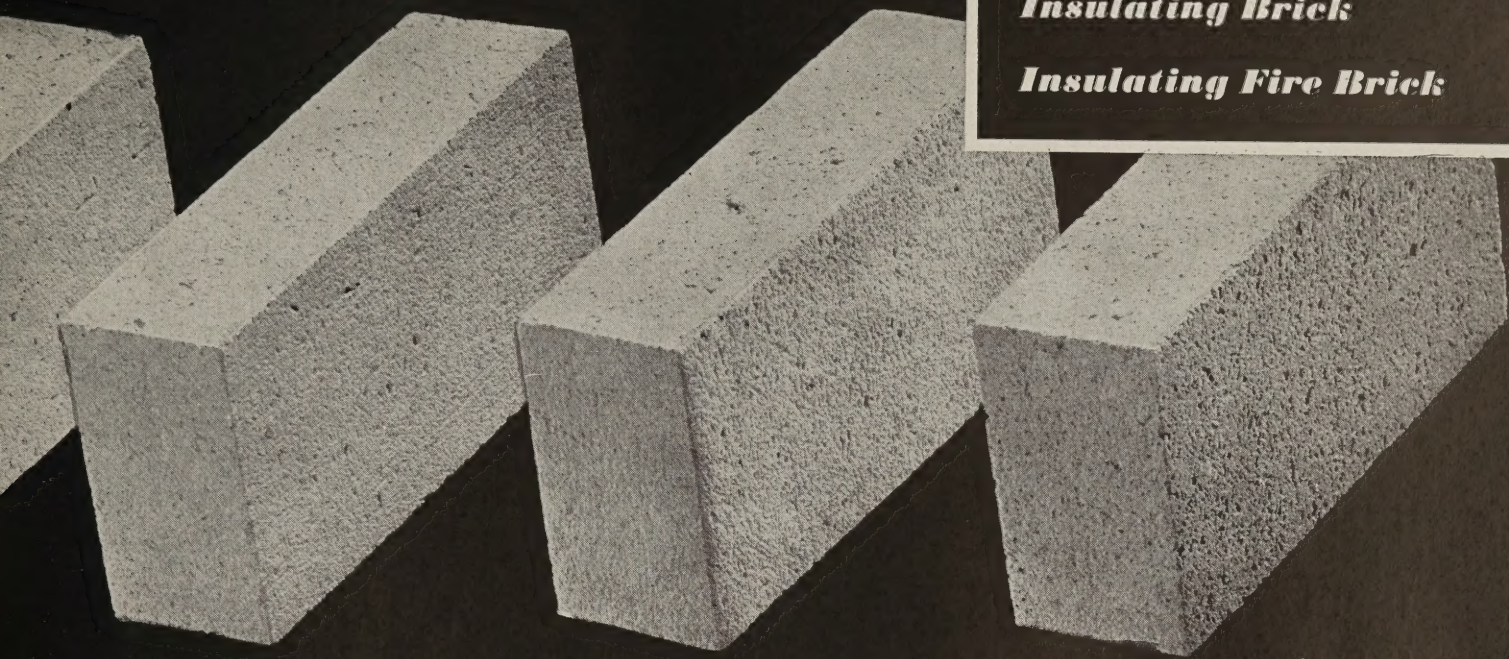
Electric Furnaces
Enameling Furnaces
Flues
Forge Furnaces
Glass Tanks
Gas Producers
Galvanizing and Tinning Furnaces

Industrial Products

INSULATIONS

Insulating Brick

Insulating Fire Brick



JM-20 Insulating
Fire Brick

JM-23 Insulating
Fire Brick

JM-26 Insulating
Fire Brick

INSULATING FIRE BRICK

For Temperatures to 2600 F

DESCRIPTION—Produced from a high quality refractory clay and a carefully graded organic filler, which, upon being burned out during the manufacturing process, gives a uniform controlled pore structure to each brick. All four Insulating Brick are moulded and fired and then accurately ground to size.

USE—Insulating Fire Brick are used as refractory lining or back-up insulation behind other refractory protection for temperature condition to a maximum of 2600 F on the brick. Their light weight and high insulating value make possible thinner furnace walls, improved efficiency and lower operating costs.

Note—Available in standard fire brick sizes and shapes, in the 2½" and 3" series as well as special sizes. Packed in fibre cartons of twenty 9" straight brick or an equivalent volume of other sizes.

Properties	JM-1620	JM-20	JM-23	JM-26
Density—lb per cu. ft.	29	35	42	48
Transverse Strength—lb per sq. in.	60	80	120	125
Cold Crushing Strength—lb per sq. in.	70	115	170	160
Linear Shrinkage—Percent	0.0 @ 2000 F	0.0 @ 2000 F	0.0 @ 2300 F	0.5 @ 2600 F
Reversible Thermal Expansion—Percent	0.5-0.6 @ 2000 F	0.5-0.6 @ 2000 F	0.5-0.6 @ 2000 F	0.5-0.6 @ 2000 F
Conductivity at Mean Temperature				
500 F	.77	.97	1.51	1.92
1000 F	1.02	1.22	1.91	2.22
1500 F	1.27	1.47	2.31	2.52
2000 F	....	1.72	2.70	2.82
Recommended Service				
Back Up	2000 F	2000 F	2300 F	2600 F
Exposed	1600 F	2000 F	2300 F	2600 F
Recommended Mortar for Setting Brick	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement
Weight per standard 9 x 4½ x 2½ in. straight brick	1.7 lb	2.1 lb	2.5 lb	2.8 lb

Above tests are in accordance with ASTM tentative standards.

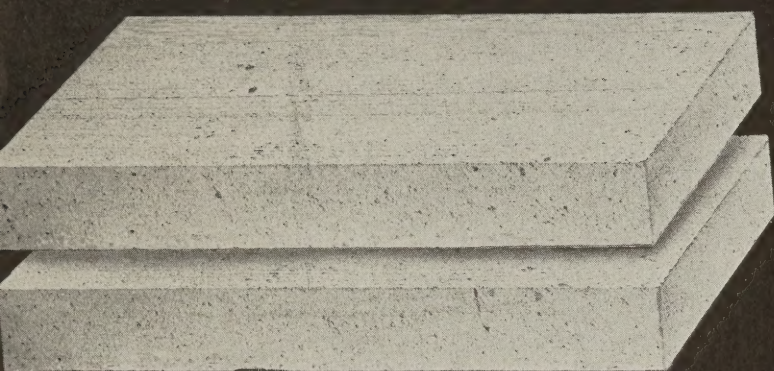
Conductivity is expressed in Btu in. per hr per sq ft per deg. F at the designated mean temperatures.

SERVICE RECOMMENDATIONS (Cont'd)

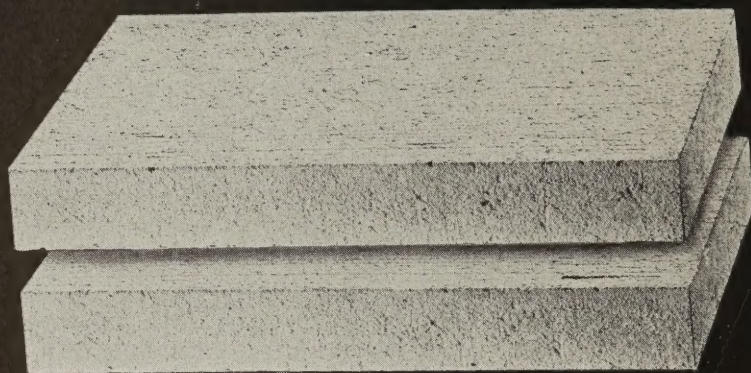
Hardening Furnaces
Hot Blast Mains
Hot Blast Stoves
Heat Treating Furnaces
Incinerators
Japanning Ovens
Lehrs
Normalizing Furnaces

Open Hearth Furnaces
Oil Heaters and Stills
Pottery Kilns
Pack & Pair Furnaces
Producer Gas Mains
Recuperators
Reduction Pots (Aluminum)
Regenerators

Retorts
Radiant Tube Annealing Covers
Slab Heating Furnaces
Soaking Pits
Stress Relieving Furnaces
Structural Clay Product Kilns
Stacks
Salt-Bath Furnaces



Top: JM-1620 Fireblok
Bottom: JM-20 Fireblok



Top: JM-23 Fireblok
Bottom: JM-26 Fireblok

INSULATING FIREBLOK

For temperatures to 2600 F.

DESCRIPTION—Insulating Fireblok are similar in composition and properties to Insulating Fire Brick (described on page 7). They are suitable for the same range of temperature conditions—but one Fireblok will cover more surface than five full sized Fire Brick. Their large, convenient size and light weight assure fast economical installation. Fireblok are easily cut with a saw and shaped with a

rasp . . . special shapes can be shop or field cut reducing the inventory of special shapes. Its large size materially reduces the number of joints, resulting in a thermally more efficient construction and requiring a minimum of mortar for bonding.

USE—Fireblok can be used wherever Insulating Fire Brick are recommended. They are particularly suitable for the lining of doors, and, when tapered, sprung arches of exceptional stability can be constructed. Also recommended for the construction of laboratory and tool room furnaces. (See pages 6 and 7 for Service Recommendations.)

Properties	J-M 1620	J-M 20	J-M 23	J-M 26
Density—lb per cu. ft	29	35	42	48
Transverse Strength—lb per sq. in.	60	80	120	125
Cold Crushing Strength—lb per sq. in.	70	115	170	190
Linear Shrinkage—Percent	0.0 @ 2000 F	0.0 @ 2000 F	0.3 @ 2300 F	1.0 @ 2600 F
Reversible Thermal Expansion—Percent	0.5–0.6 @ 2000 F	0.5–0.6 @ 2000 F	0.5–0.6 @ 2000 F	0.5–0.6 @ 2000 F
Conductivity at Mean Temperature				
500 F	.77	.97	1.51	1.92
1000 F	1.02	1.22	1.91	2.22
1500 F	1.27	1.47	2.31	2.52
2000 F	....	1.72	2.70	2.82
Recommended Service				
Back Up	2000 F	2000 F	2300 F	2600 F
Exposed	1600 F	2000 F	2300 F	2600 F
Recommended Mortar for Setting Brick	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement

Above tests are in accordance with ASTM tentative standards. Conductivity is expressed in Btu in. per hr per sq. ft per deg F at the designated mean temperatures.

Standard sizes—9 x 24 in., 9 x 12 in., 4½ x 24 in., and 4½ x 12 in. Standard thicknesses—2½ in. and 3 in.

SIL-O-CEL C-3 INSULATING CONCRETE For Temperatures to 1800 F.

Sil-O-Cel C-3 in the form of insulating concrete, can be cast into any shape desired. This has made it possible to utilize insulation where previously it had been impossible to do so for structural reasons. Sil-O-Cel C-3 can be easily cast in monolithic form for the construction of doors, baffles, dampers. When suitably reinforced, it may be moulded into large units. Sil-O-Cel C-3 Insulating Concrete is made by mixing four parts of Sil-O-Cel C-3 and one part of portland or lumnite cement, by volume, with sufficient water to form a plastic, coherent mass. Care should be taken to avoid excess water. For this purpose approximately 28 lb. of Sil-O-Cel C-3 are required per cu. ft., when tamped into place and dried. Sil-O-Cel C-3 Concrete can be applied either to steel surfaces

or brick walls by pouring and tamping into place in forms as with concrete, or by use of a cement gun.

Sil-O-Cel C-3 Concrete is over three times as effective as fire brick in preventing heat penetration. Made in accordance with specifications, the material sets up into a strong, durable concrete weighing approximately 60 lb. per cu. ft. and with a crushing strength of about 1,000 lb. per sq. in. (72 tons per sq. ft.). It has a high degree of refractoriness for an insulating material and can be used without other refractory protection where it may be subjected to direct heat as high as 1800 F. Suitable reinforcing, such as would be used in ordinary concrete, and provision for expansion joints are important in the case of Sil-O-Cel C-3 as with any other monolithic material.

Industrial Products

85% MAGNESIA PIPE INSULATION

For temperatures to 600 F.

DESCRIPTION—J-M 85% Magnesia Pipe Insulation combines the high insulating quality of basic carbonate of magnesia with asbestos moulded into a lightweight, efficient insulation.

USE—The universal insulation for heated piping in power and industrial installations.

Size	Thickness
3-ft. sections and segments to fit standard pipe sizes	Standard (varies from $\frac{3}{8}$ to $1\frac{1}{2}$ in. depending on pipe size), $1\frac{1}{2}$, 2, $2\frac{1}{2}$ in. Double Standard (two layers, each Standard Thick) and in 3 in. (double layer, for broken joint construction).

Also supplied to fit straight runs of copper pipe or tubing with nominal diameters of $\frac{3}{8}$ in. and larger.

ASBESTO-SPONGE FELTED PIPE INSULATION

For temperatures to 700 F.

DESCRIPTION—Built-up of asbestos felts so combined as to produce a spongy, laminated material, there being about 40 laminations per in. of thickness. Its rugged construction gives the mechanical strength necessary to withstand severe usage, vibration and yet permanently maintain its original high insulation efficiency. It has high salvageability.

USE—For insulating pipes conveying heated liquids and vapors in industrial plants where the service requires not only high insulating efficiency but a material which will withstand considerable abuse without damage. Also used on outdoor and underground piping where it has demonstrated practically no loss in insulating efficiency after being soaked and subsequently dried out. For these uses, it is often furnished with an integral weatherproof asbestos jacket.

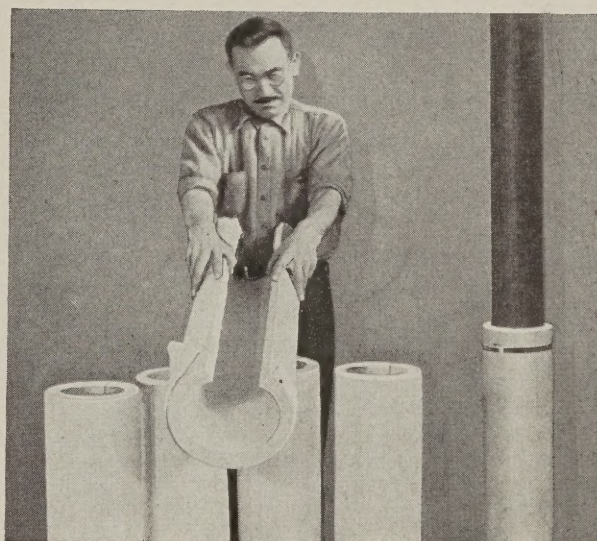
Size	Thickness
3-ft sections	1 to 3 in.; 3 in. thickness is furnished in two-layer construction unless solid construction specified. Less than 3 in. thickness furnished solid unless otherwise specified.

Supplied to fit standard pipe sizes and straight runs of copper pipe or tubing with nominal diameters of $\frac{3}{8}$ in. and larger.

INSULATIONS

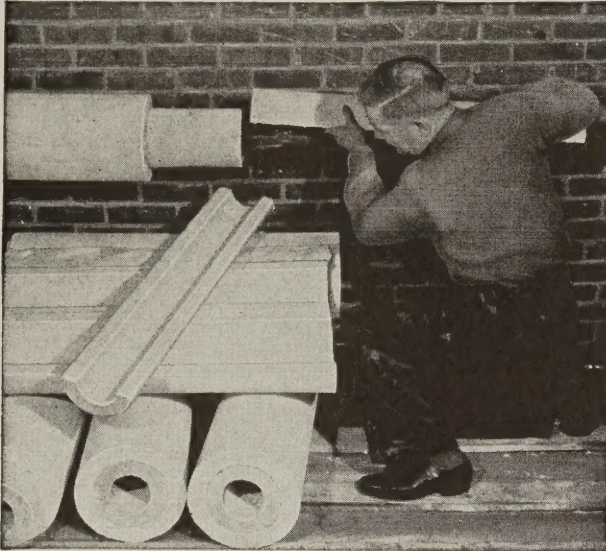
Insulating Fireblok

Pipe



Thickness Recommendations
Asbesto-Sponge Felted Pipe Insulation

Steam pressure or condition	Temperature, degrees F.	Thickness of insulation, in.		
		Pipes larger than 4 in.	Pipes 2 to 4 in.	Pipes smaller than 2 in.
Hot Water		1	1	1
0 to 25 lb	212 to 266	1	1	1
25 to 100 lb	267 to 337	$1\frac{1}{2}$	1	1
100 to 200 lb	338 to 387	2	$1\frac{1}{2}$	1
Low Superheat	388 to 499	$2\frac{1}{2}$	2	$1\frac{1}{2}$
Superheat	500 to 599	3	$2\frac{1}{2}$	2
High Superheat	600 to 700	$3\frac{1}{2}$	3	2



SUPEREX COMBINATION PIPE INSULATION

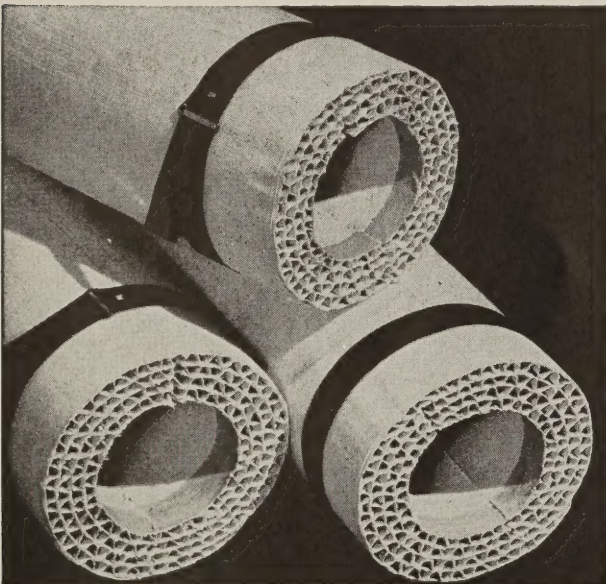
For temperatures to 1900 F.

DESCRIPTION—A two layer insulation combining the insulating efficiency and the greater heat resistance of Superex, as the inner layer, with the superior insulating quality of J-M 85% Magnesia or Asbesto-Sponge Felted for the outer layer.

USE—On high temperature piping conveying vapors in power and industrial plants where the pipe temperatures exceed 600 to 700 F. The double layer construction permits staggered joint application, prevents open joints due to expansion of the high temperature piping.

Size	Thickness*
3-ft sections or segments to fit standard pipe size	2 to 4 in. combination.

*See table, page 11, for actual thicknesses.



PRE-SHRUNK ASBESTOCEL PIPE INSULATION

For temperatures to 300 F.

DESCRIPTION—Made of alternate layers of plain and corrugated asbestos felts. The asbestos felts are processed to make them moisture-resistant, thus removing the cause of objectionable shrinkage.

USE—Insulation of both low pressure steam and hot water piping in domestic heating systems.

Size	Thickness
Made four plies to the inch, in 3-ft sections, to fit standard pipe sizes	Two to eight plies.

Also supplied to fit straight runs of copper tubing with nominal diameters of $\frac{3}{8}$ in. and larger.

Finishes—High-speed type furnished with asbestos paper finish, fastened with staples and requiring no pasting. Saves $\frac{1}{3}$ in labor. Also available in regular canvas-covered finish.

BANROC PIPE INSULATION

For temperatures to 1000 F.

DESCRIPTION—Made of felted mineral wool secured between two layers of copper-bearing metal lath. Has wire arch supports to resist compression and is protected with a 24-gauge galvanized iron outer casing.

USE—On outdoor lines in oil refineries where a fireproof, weatherproof jacket is desired or where the insulation must be frequently removed for pipe repairs or changes.

Size	Thickness
2-ft sections	1 to 4 in.

Special sections available for curved piping.

PRE-SHRUNK WOOL FELT PIPE INSULATION

For temperatures to 225 F.

DESCRIPTION—Made of a specially indented wool felt and provided with a dual service liner.

USE—On hot or cold water service lines. Prevents sweating on cold water pipes. Supplied in canvas finish which may be primed and painted for use where pipes are exposed to view.

Size	Thickness
3-ft sections for all standard pipe sizes.	$\frac{1}{2}$, $\frac{3}{4}$, 1 in., Double $\frac{1}{2}$ in. and Double $\frac{3}{4}$ in. for all pipe sizes

Also furnished for straight runs of copper tubing with nominal diameters of $\frac{3}{8}$ in. and larger. An integral weatherproof jacket is supplied on Pre-Shrunk Wool Felt, when so ordered.

GENERAL INSULATION PROCEDURE

In general, all pipes, fittings and flanges at temperatures below 600 F, except small fittings which are insulated with J-M No. 302 Cement, should be insulated with Asbesto-Sponge Felted or J-M 85% Magnesia to the thickness given in table below. Asbesto-Sponge Felted may be used, where conditions warrant, up to 700 F.

All pipes 1½ in. and smaller, at temperatures above 600 F (or above 700 F, if Asbesto-Sponge Felted is used), should be insulated with a single layer of Superex sectional pipe insulation 2 in. thick. Small fittings are insulated with J-M No. 302 Cement. For sizes larger than 1½ in., at temperatures above

600 or 700 F, Superex Combination Insulation should be used. This consists of a layer of Superex next to the pipe, over which is applied Asbesto-Sponge Felted or J-M 85% Magnesia, as desired.

The thicknesses given represent standard practice in general use on heated lines. Exceptional conditions may make other thickness necessary. On outside piping, it is customary to use insulation ½ in. thicker than that recommended for indoor lines for the same temperatures and service.

J-M 85 % MAGNESIA OR ASBESTO-SPONGE FELTED

Thickness of insulation, J-M 85% Magnesia			Temperature F.	Thickness of insulation, Asbesto-Sponge Felted		
Pipes larger than 4 in.	Pipes 2 in. to 4 in.	Pipes smaller than 2 in.		Pipes larger than 4 in.	Pipes 2 in. to 4 in.	Pipes smaller than 2 in.
Std.	Std.	Std.	Below 212	1	1	1
Std.	Std.	Std.	212 to 266	1	1	1
1½	Std.	Std.	267 to 337	1½	1	1
2	1½	Std.	338 to 387	2	1½	1
Dbl. Std.	2	1½	388 to 499	2½	2	1½
3	Dbl. Std.	2	500 to 599	3	2½	2
			600 to 700	3½	3	2
See table below.						

RECOMMENDED
THICKNESS
TO 700 F



SUPEREX COMBINATION INSULATION

Temperatures	600-699 F.		700-799 F.		800-1000 F.	
	Thickness of insulation, in.		Thickness of insulation, in.		Thickness of insulation, in.	
	Superex	85% Magnesia	Superex	Asbesto- Sponge Felted or 85% Magnesia	Superex	Asbesto- Sponge Felted or 85% Magnesia
1½ and smaller....	2	1½	2	1½	2	1½
2.....	1½	1½	1½	1½	1½	1½
2½.....	1½	1½	1½	1½	1½	1½
3.....	1½	1½	1½	1½	1½	1½
3½.....	1½	1½	1½	1½	1½	1½
4.....	1½	1½	1½	1½	1½	1½
4½.....	1½	1½	1½	1½	1½	1½
5 and larger, approx.....	1½	2	1½	2½	2 approx.	2

RECOMMENDED
THICKNESS
ABOVE 700 F



INSULATION FINISHES

All insulation on piping indoors should be finished with a jacket of 8-oz. canvas, sewed on over rosin-sized paper or asbestos paper, sized with glue and painted with two coats of lead and oil paint.

Where other insulation than Asbesto-Sponge Felted with integral weatherproof jacket is used, the best weather protection for insulated outdoor pipe lines is a weatherproof asbestos jacket of J-M Double Coated Flexstone, applied over the insulation and fastened by rings of heavy non-corroding wire on 4 in. centers. J-M Double-Coated Flexstone is furnished in rolls of 108 sq ft, 32 in. wide, weighing approximately 50 lbs per roll.

Where rough usage may be encountered, a metal jacket may be used instead of the weatherproof Flexstone jacket.

Where exposed to fire hazard, asphalt-saturated roofing jackets are inadvisable, since flame may be carried along exposed piping when a fire occurs adjacent to the line. In such cases, it is good practice to apply a J-M Asbestos Firetard Jacket. This consists of one sheet of asphalt-saturated asbestos felt over which is cemented an unsaturated felt. It will not drip asphalt nor support combustion. Furnished in 108 sq ft rolls, 32 in. wide, weighing approximately 55 lbs per roll.

INSULATING CEMENTS

Johns-Manville manufactures a complete line of Insulating and Finishing Cements, each designed for a specific purpose. All of these J-M Cements may be depended upon for insulating efficiency and covering capacity unsurpassed by other similar products.

Asbestos insulating cements are generally used as a surface finish over block or sheet insulation, to seal the joints and provide a smooth, attractive, durable finish or a surface to which canvas may be applied if painting is desired.

J-M 85% Magnesia, Superex, No. 450 and No. 500 Cements are used for insulating irregular surfaces where it would be impractical to apply sectional insulation or the standard sheets or blocks.

SUPEREX INSULATING CEMENT

For temperatures to 1900 F.

DESCRIPTION—Made in powdered or cement form.

USE—On irregular surfaces where block or pipe insulation is impractical.

No. 678 SEMI-REFRACTORY INSULATING CEMENT

For temperatures to 1900 F.

DESCRIPTION—Combined finishing and semi-refractory, hydraulic setting insulating cement.

USE—As a protective coating over block insulation linings exposed to the erosive action of moving gases in flues, breechings and stacks.

No. 500 INSULATING CEMENT

For temperatures to 1800 F.

DESCRIPTION—An expanded vermiculate base cement with exceptionally high covering capacity, combined with good adhesion, working qualities and insulating value.

USE—On irregular surfaces where high adhesion and insulating value are required.

Note—Readily applied with trowel or cement gun.

No. 319 SEMI-REFRACTORY CEMENT

For temperatures to 1600 F.

DESCRIPTION—A hard setting silica base asbestos cement.

USE—For setting and sealing high temperature insulation in stacks and rotary kilns.

No. 450 INSULATING CEMENT

For temperatures to 1500 F.

DESCRIPTION—A mineral wool and asbestos cement with good covering capacity and excellent adhesion to both hot and cold surfaces.

USE—On irregular surfaces where high adhesion and insulating value are required.

No. 302 INSULATING CEMENT

For temperatures to 1000 F.

DESCRIPTION—Made of asbestos fibre and bonding materials. It is a high-grade finishing cement, easy to mix and apply.

USE—As a finish over block or sheet insulation to seal the joints and provide a hard, durable and attractive surface. Also for insulating small fittings in heated piping.

No. 0352 AND No. 352 INSULATING CEMENTS

For temperatures to 1000 F.

DESCRIPTION—General utility, short fibre cements.

USE—By the steam-fitting and plumbing trade for insulating and finishing domestic heating boilers and low-pressure pipe fittings.

No. 400 INSULATING CEMENT

For temperatures to 700 F.

DESCRIPTION—Made of asbestos fibre and bonding materials. It is a smooth-finish cement with exceptional insulating value.

USE—As a finish over block or sheet insulation on irregular surfaces such as pipe fittings in heating systems, etc.

85% MAGNESIA CEMENT

For temperatures to 600 F.

DESCRIPTION—Made in powdered or cement form.

USE—On irregular surfaces where block or pipe insulation is impractical.

DATA ON JOHNS-MANVILLE INSULATING CEMENTS

Designation	General Use	Character or Base	Temp. Limit deg. F.	Covering Capacity, Applied and Dried, 1 in Thick		Approx. lb of Water to mix 100 lb Cement	Packaging, lb per Bag
				Sq ft/100 lb	Sq ft/Bag		
No. 302	Finishing	Asbestos	1000	25	25	175	100
No. 400	"	"	700	25	25	150	100
No. 352	"	"	1000	19	9½ or 19	100	50 or 100
No. 0352	"	"	1000	19	19	100	100
Superex	Insulating	Diatomaceous Silica	1900	45	34	250	75
No. 500	"	Expanded Vermiculite	1800	78	39	300	50
No. 450	"	Mineral Wool	1500	50	25	250	50
85% Magnesia	"	Magnesium Carbonate	600	58	35	450	60
No. 678	Finishing	Semi-Refractory	1900	20	10	75	50
No. 319	"	"	1600	15	7½	60	50

SIL-O-CEL C-3

For temperatures to 2000 F.

DESCRIPTION—Calcined coarse graded granular, diatomaceous silica.

USE—As an insulating fill on high temperature equipment.

How Used	How Furnished
Usually packed to density of 31 lbs. per cu. ft.	100 lb. bags

FIBRO-CEL

For temperatures to 1800 F.

DESCRIPTION—A mixture of Sil-O-Cel (diatomaceous silica) and long fibre asbestos.

USE—As an insulating fill in gas generator sets and similar equipment.

How Used	How Furnished
Usually packed to density of 18 lbs. per cu. ft.	80 lb. bags

SIL-O-CEL INSULATING POWDER

For temperatures to 1600 F.

DESCRIPTION—Finely ground Sil-O-Cel (diatomaceous silica).

USE—Used as an insulating filler.

How Used	How Furnished
Usually packed to density of 15 to 17 lbs. per cu. ft.	50 lb. bags

SIL-O-CEL COARSE GRADE

For temperatures to 1600 F.

DESCRIPTION—Similar to Sil-O-Cel Insulating Powder but more coarsely ground.

USE—Used as an insulating filler.

How Used	How Furnished
Usually packed to density of 22 lbs. per cu. ft.	100 lb. bags

WEATHERPROOFING FOR INSULATION

INSULKOTE

For temperatures to 400 F.

DESCRIPTION—Insulkote is a durable, yet easily applied plastic weatherproof coating for insulation. It will not carry flame.

USE—For outdoor tanks, towers and other exposed insulated equipment. Stands up under extreme weather conditions and remains sufficiently elastic to prevent its cracking.

How Furnished	How Applied
In ready-mixed, plastic form, in containers weighing approx. 50, 150 and 450 lb.	Its consistency is suitable to apply with trowel. Applied in one coat $\frac{1}{8}$ " thick, it will cover about 55 sq. ft. per 100 lbs.

FIL-INSUL

For temperatures to 1000 F.

DESCRIPTION—An asbestos and mineral wool insulation.

USE—Where a resilient insulation is required.

How Used	How Furnished
Usually packed to density of 17 lbs. per cu. ft.	40 lb. paper bags

BANROC

For temperatures to 1000 F.

DESCRIPTION—Banroc is a mineral wool fibre. Furnished as Banroc Loose and Banroc Granulated (nodulated form).

USE—As an insulating filling in baking ovens, fireless cookers, electric and gas ranges and similar equipment.

How Used	How Furnished
Loose—Usually packed to density of 12 lbs. per cu. ft. Granulated—May be packed to various densities but 9 to 10 lb. per cu. ft. is recommended when the material is loosely poured into place and 10 to 12 lb. per cu. ft. when hand packed.	Loose—in 40 lb. paper bags Granulated—in 40 lb. paper bags

GRANULATED ROCK CORK

For temperatures below 100 F.

DESCRIPTION—Granulated Rock Cork is a mineral wool product with a bituminous binder.

USE—Where a loose, moisture-resisting filler is required for low temperature service and which can be poured into place.

How Used	How Furnished
Usually packed to density of 12 to 14 lb. per cu. ft.	35 lb. paper bags

ZEROFIL

DESCRIPTION—Zerofil is an asphalt-impregnated loose mineral wool (not granulated). It is highly resistant to moisture.

USE—As a low temperature insulation where a hand-packed type of insulation is required to fill irregular spaces.

How Used	How Furnished
Usually packed to density of 10 lbs. per cu. ft.	35 lb. paper bags

AERTITE COATING

For temperatures to 250 F.

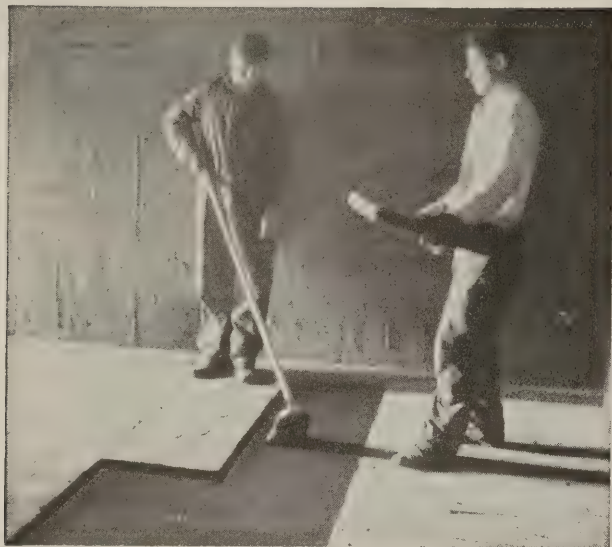
DESCRIPTION—It is a tough, rubbery, asphaltic-asbestos coating in plastic form.

USE—Often used like Insulkote for weatherproofing insulation outdoors. Its primary use, however, is for coating boiler walls to prevent air infiltration.

Note—Aertite is black in color but can be painted with aluminum paint.

How Furnished	How Applied
In 25, 50, 150, 300 and 500 lb. containers	Applied in a thin troweled coat to approx. $\frac{1}{8}$ " thickness. For a $\frac{1}{8}$ " coat, 50 to 80 lbs. are required per 100 sq. ft. depending upon character of the surface.

(For other weatherproof finishes over pipe insulation, see paragraphs, "Insulation Finishes," on page 11.)



Installing Rock Cork Insulation on walls and floor of a cold room.

ROCK CORK SHEETS AND BLOCKS

For refrigerating temperatures from 100 F to minus 400 F.

DESCRIPTION—Basically mineral in composition Rock Cork is highly moisture-resistant, permanently rot-proof, chemically inert, odorless and incapable of absorbing odors. Rock Cork is sanitary, vermin-proof, rodent-proof and will not support the growth of mold or bacteria. Its innumerable tiny air spaces are completely sealed by a waterproof binder. It resists the infiltration of air and moisture, thus eliminating this direct cause of most refrigeration insulation failures.

USE—Recommended as the most efficient and economical insulation for cold rooms, ducts and refrigerating equipment.

Size	Thickness	Weight
Sheets furnished in standard sizes 18 x 36 in.	1, 1½, 2, 3 and 4 in.	* Sheets weigh about 1.25 lb. per sq. ft. per in. of thickness, uncartoned. Cartoned, the weight is about 1.3 lb. per sq. ft. per in. of thickness.
Other sizes within above limitations and intermediate thicknesses can be furnished on special order.		
Flat discs furnished in 1½, 2, 3 and 4 in. thicknesses in one piece up to 18 in. diameter; and in two pieces for longer diameters up to 36 in.		
* Sheets, according to thicknesses, packed in cartons as follows: 1 in., 54 sq. ft.; 1½ in., 36 sq. ft.; 2 in., 27 sq. ft.; 3 in., 18 sq. ft.; and 4 in., 13½ sq. ft.		

RECOMMENDED THICKNESSES OF J-M ROCK CORK SHEETS

While many factors, such as the cost of refrigeration and local atmospheric and temperature conditions, may govern the amount of insulation which should be used, the thicknesses of Rock Cork sheets or lagging given in the following table are recommended for general requirements:	Temperature range, deg. F.	Thickness, inches
	-60 to -40 -40 to -25 -20 to - 0 0 to 15 15 to 25 25 to 35 35 to 45*	9—Three layers 8—Three layers 7—Two layers 6—Two layers 5—Two layers 4—1 or 2 layers 3 or 2—1 layer
* Suitable thickness of insulation at this higher temperature range generally depends on other factors than temperature difference. Among these are cost of refrigeration, surface temperature and dew point.		

Industrial Products

ROCK CORK PIPE INSULATION

DESCRIPTION—Rock Cork Pipe Insulation embodies all the properties and features of Rock Cork Sheet and Blocks. It is furnished with a factory applied integral waterproof jacket with a flap to seal down over the longitudinal joint upon installation. With a similar treatment of the circumferential joint between sections and the most effective method of insulating fittings yet devised, Rock Cork Pipe Insulation will provide, when properly applied, an unbroken, seamless sheath of insulation which is airtight and moisture-proof.

USE—For pipe lines carrying ice water, brine, ammonia and other refrigerated fluids.

Rock Cork Pipe Insulation is furnished in 3-ft sections, in the following thicknesses:

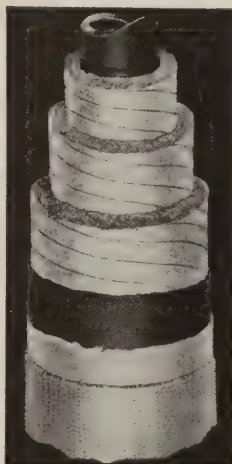
Thickness	Temperature Range
Ice Water (1.4 to 2 in.)	30 to 50 F
Brine (2 to 3.2 in.)	0 to 30 F
Heavy Brine (2.8 to 4 in.)	-30 to 0 F

For temperatures below -30 F, Rock Cork in the form of lagging is applied over Heavy Brine thickness Rock Cork Pipe Insulation.

BUILT-UP BRINE AND AMMONIA PIPE INSULATION

DESCRIPTION—Consists of two or more layers of hair felts carefully applied and sealed. The sealing method eliminates the possibility of moisture accumulating between pipe and insulation and then freezing and bursting the insulation. It is an efficient insulator and will withstand contraction and expansion of pipe without cracking or breaking open.

USE—For pipe lines conveying brine, ammonia or other cold liquids or gases.



Recommended Thicknesses		
Plus 40 to plus 15 F.....	2 in.	insulation
Plus 15 to minus 5 F.....	3 in.	insulation
Minus 5 to minus 20 F.....	4 in.	insulation
Minus 20 to minus 40 F.....	5 in.*	insulation
Minus 40 to minus 60 F.....	6 in.*	insulation

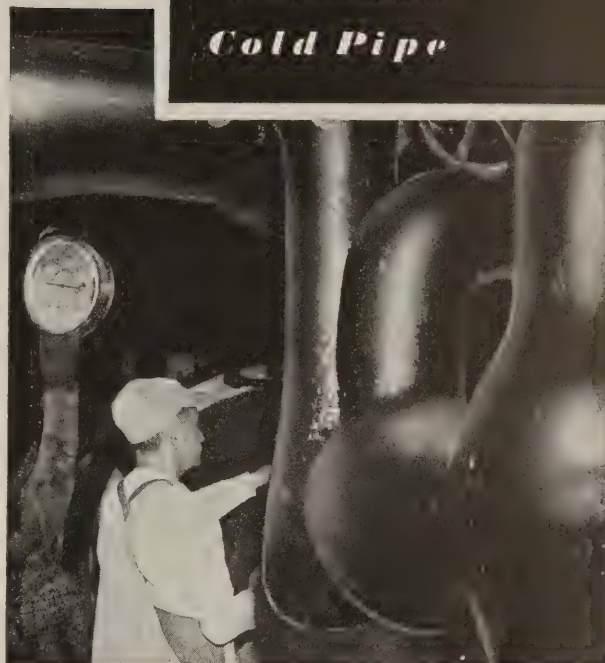
*For pipes smaller than 3 1/2 in., at temperatures from minus 20 to minus 60 F., deduct 1 in. of insulation from the recommended thickness. Where temperatures are below minus 60 F., recommendations will be furnished on receipt of details of the particular conditions.

Built-Up insulation, to be satisfactory, should be applied only by mechanics specially trained in low temperature work. Johns-Manville Approved Contractors are experienced in this type of application.

INSULATIONS

Cold Room

Cold Pipe



ANTI-SWEAT PIPE INSULATION

DESCRIPTION—Made of laminated insulating felt protected inside and out with waterproofing felts.

USE—As its name implies, it is designed to prevent sweating and dripping and to keep cold water cold.



Size	Thickness
Furnished in 3-ft sections	1/2 and 3/4 in. solid construction and in 1, 1 1/2 and 2 in. double layers for broken joint construction.

Also supplied to fit straight runs of copper pipe or tubing with outside diameters of 3/8 in. and larger.

ZERO PIPE INSULATION

DESCRIPTION—Composed of layers of hair felt and wool felt, with a layer of asphalt-saturated wool felt inside.

USE—To prevent pipes from freezing under moderate conditions. If used outdoors, it must be waterproofed.

Size	Thickness
In 3-ft sections	1 1/4 in.

Furnished in all standard pipe sizes.

BUILT-UP HAIR FELT PIPE INSULATION

DESCRIPTION—Consists of a number of layers of 1 in. Standard Hair Felt securely bound in place on the pipe by heavy jute twine and finished on the outside with a waterproof jacket.

USE—To protect water pipes from freezing where the pipes are subjected to severe conditions.

Note—Recommendations as to thickness to protect pipes under all conditions, data on freezing time of water in pipes, etc. will be furnished on request. Ask for Data Sheet IN-390.

CASTABLE REFRACTORIES

Castable Refractories have greatly simplified much refractory construction which formerly had been difficult and expensive with standard fire brick or special refractory shapes. Castable Refractories are shipped dry in 100-lb. bags and, mixed with water on the job, can be handled as easily as ordinary concrete, either tamped or poured in place.

Castable Refractories are recommended for furnace doors of all types, furnace bottoms, baffle and header protector tile, burner rings and a great variety of special refractory shapes. They are highly resistant to spalling and have practically no drying or firing shrinkage. Available in three types, as follows, for varying service requirements:

STANDARD FIRECRETE

For temperatures to 2400 F.

DESCRIPTION—This is the most generally applicable type of Firecrete. It is composed principally of selected, gradated, calcined material that will pass a 6-mesh screen (6 openings per inch).

USE—Because of its relatively fine gradation, it can be used for refractory linings or shapes as thin as 1½ in.

H. T. (High Temp.) FIRECRETE

For temperatures to 2800 F.

DESCRIPTION—Composed of a heat-resistant base which makes it applicable for use against extremely high temperatures. Otherwise similar in properties to Standard Firecrete. The calcined refractory material from which it is made will pass a 3-mesh screen.

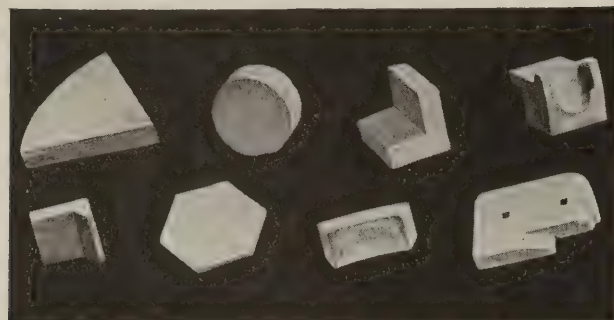
USE—For refractory linings and shapes.

L. W. (Light Weight) FIRECRETE

For temperatures to 2400 F.

DESCRIPTION—Composed of light weight materials. It has unusually low thermal conductivity (1.5 Btu inch per hour per sq. ft. deg. F. at mean temperature of 800 F.). It is approximately four times as effective as fire brick in retarding heat flow. Its low heat storage capacity (50% lower than fire brick) and high resistance to spalling make it the ideal insulating refractory concrete.

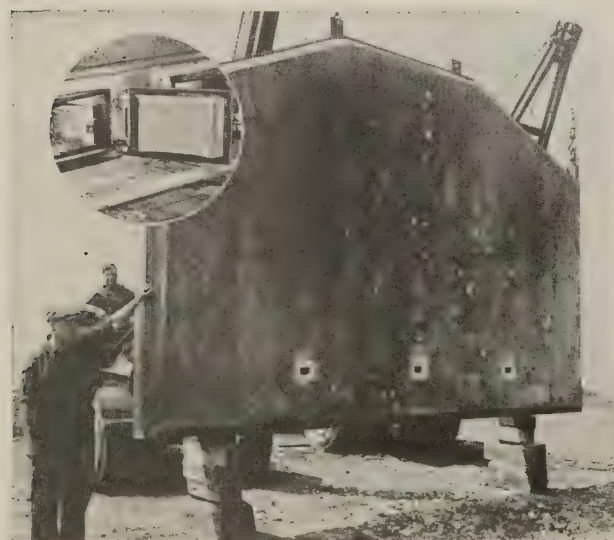
USE—For lining doors of all sizes and for casting special shapes, furnace bottoms and small monolithic furnaces.



With Firecrete, special refractory shapes of any size can be cast right on the job and be ready for service within 24 hours.



When mixed with water on the job, J-M Firecrete is handled as easily as ordinary concrete. It is ideal for casting special shapes right on the job—when and where they are needed.



Firecrete is suitable for all sizes of new and old doors, from small clean-out doors to those used on large treating furnaces.

Industrial Products

HELLITE REFRACTORY CEMENT

For temperatures to 3000 F.

DESCRIPTION—A general purpose refractory cement. It is an air-setting, ready-mixed plastic, finely ground, easily workable and makes strong permanent fire brick joints. Hellite has excellent adherences, minimum shrinkage in drying and firing and will not bloat or puff up on rapid heating. Supplied in a proper consistency for use with paddle or trowel. May be readily thinned with water for thin mortar joints or for gun or brush coatings.

USE—For setting fire brick with thin or heavy joints; for washcoating (increases the resistance of the fire brick to gases). It is recommended for shallow patching either hot or cold.

REFRACTORY CEMENTS NOS. 31 & 32

For temperatures to 3100 F.

DESCRIPTION—No. 31 Refractory Cement is a coarse base, heat-setting cement. When mixed with water it develops excellent plasticity, handles easily and will not settle in the mixing box.

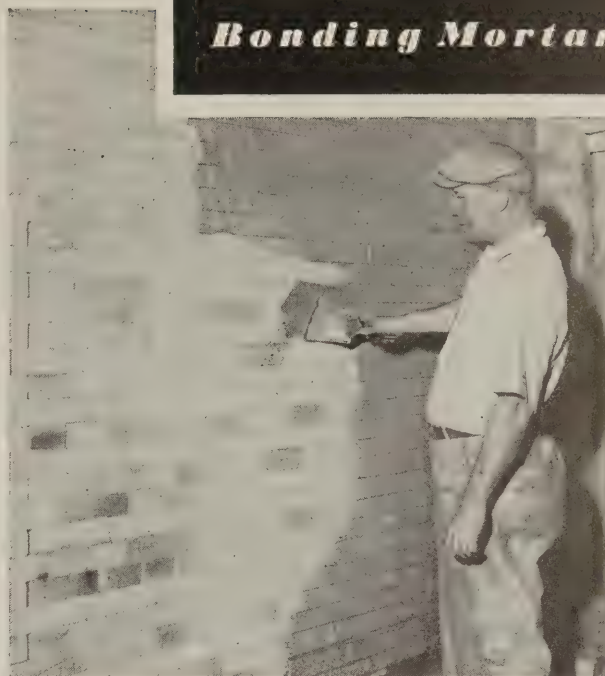
No. 32 Refractory Cement is similar to No. 31 but with a finely ground base.

USE—No. 31 for brick setting with bond or cushion joint. No. 32 for brick-to-brick joints and wash coating.

REFRACTORY PRODUCTS

Castables

Bonding Mortars



Wash coating a boiler wall with Johns-Manville Hellite. For brick setting, wash coating and shallow patching, with a ready-mixed, air-setting cement, J-M Hellite is a highly satisfactory, general purpose refractory cement for temperatures to 3000 F.

DATA ON JOHNS-MANVILLE REFRACTORY PRODUCTS

Type of Product	Name of Product	Character or Base	Highest working temp., degrees F	Pounds needed per cu. ft.	Estimated lbs. to set 1000 brick	Container and Net Weights
Castables	Std. Firecrete	Al. Silicate	2400	110	...	100-lb. bags
	H.T. Firecrete	High Alumina	2800	115	...	
	L.W. Firecrete	Al. Silicate	2400	70	...	
	Chrome Constable	Chrome Ore	3200	180	...	
Cements (Mortars) (ready-mixed air-setting)	Hellite†	Al. Silicate	3000	...	200-400††	25, 50, 100 250, 500 and 850-lb. drums
	No. 20†	Silica	2700	...	200-400††	
	No. 2986†	High Alumina	3200	...	200-400††	
(Cements Mortars) (dry, heat-setting)	No. 31	Al. Silicate	3100	...	600*	100-lb. bags
	No. 32†	Al. Silicate	3100	...	200-400††	
	No. 33	Kaolin	3300	...	750	
	No. 35	High Alumina	3500	...	750	
	No. 30	Silicon Carbide	3000	...	800	
Cements (Mortars) (dry, air-setting)	No. 26	Al. Silicate	2900	...	600	100-lb. bags
	No. 34	Chrome Ore	3400	200	600	
Plastics	P.F.M.B.**	Al. Silicate	3100	133	...	100, 200 and 500-lb. drums
Ramming Mixtures	No. 28 Ramming Mix	High Alumina	3100	160	...	100-lb. bags
	No. 30	Silicon Carbide	3000	180	...	
	No. 34	Chrome Ore	3400	200	...	

*The figure given is for a trowelled joint, 1/4 to 3/8-in. thick. Without asterisk, the quantities are for brick-to-brick joints. **Plastic Fire Brick Material. †Approximate quantities required for wash-coating 100 sq. ft.: 35-lb. Hellite with 7 lb. water; 40 lb. No. 20 with 7 lb. water; 35 lb. No. 2986 with 7 lb. water; 50 lb. No. 32 with 30 lb. water. ††Amount depends upon thickness of joint and porosity of the brick.

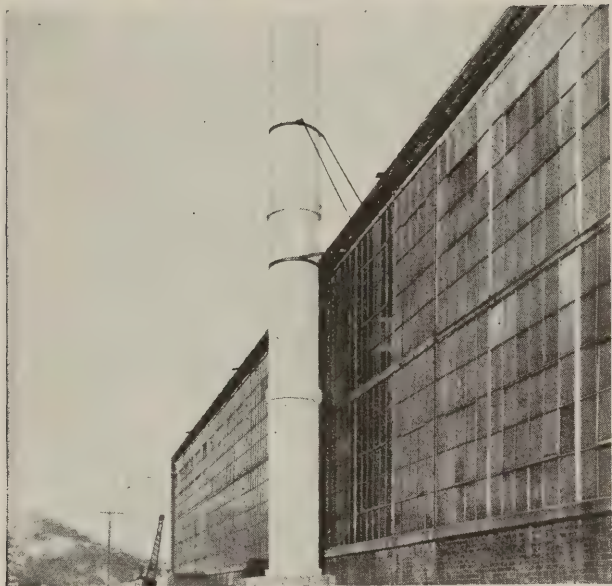
OTHER REFRACTORY PRODUCTS

In addition to the Refractory Products discussed here there are also a number of other refractories for special conditions. These are included in the table above. For detailed informa-

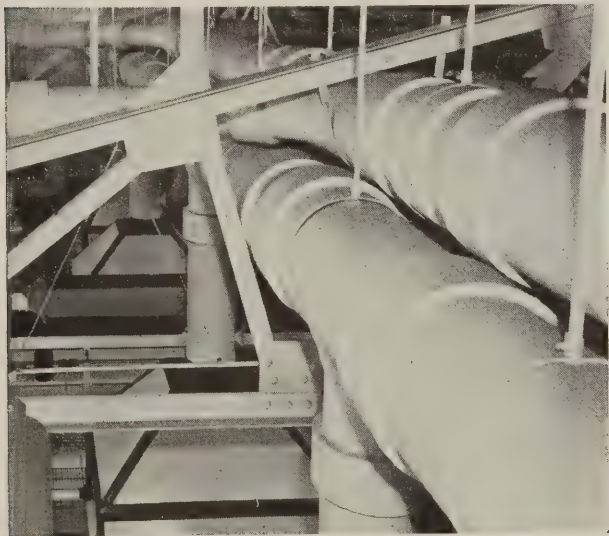
tion on these products, send for your copy of Data Sheet Series 700, which contains a table recommendation based on many years of research and experience in refractory problems.

TRANSITE INDUSTRIAL VENT PIPE

Johns-Manville



A stack of Transite Industrial Vent Pipe used to exhaust corrosive fumes from a metal-working plant



In this large chemical laboratory Transite Industrial Vent Pipe is used to vent fumes, dusts and gases

TRANSITE INDUSTRIAL VENT PIPE

For vents, ducts and stacks

Strong, durable, weatherproof and highly resistant to corrosion, this asbestos-cement pipe is giving economical service in practically every major industry where venting is a problem.

Some of the important advantages of Transite Industrial Vent Pipe include:

CORROSION RESISTANT—Made of asbestos fibres and cement, Transite Industrial Vent Pipe successfully withstands many of the corrosive gases, fumes, vapors and mists encountered in industrial venting operations. This advantage, coupled with its strength, inherent durability and thermal properties assures important economies to the user in a venting system which provides efficient service and reduced maintenance.

RUSTPROOF—Being non-metallic in composition, Transite Industrial Vent Pipe is rustproof. Painting is not necessary.

LOW HEAT CONDUCTIVITY—The low heat conductivity of Transite Industrial Vent Pipe is of advantage in maintaining the stack temperatures necessary for optimum flue conditions. Maintenance of flue temperatures also minimizes the formation of condensate on the interior of the stack or vent.

LOW INSTALLATION COSTS—The relatively light weight of Transite Industrial Vent Pipe, as well as the convenient lengths in which it is available, contribute to low handling and installation costs. Where conditions require, Transite Industrial Vent Pipe may readily be cut in the field with an ordinary rip saw.

Typical industries in which Transite Industrial Vent Pipe is used

Aircraft	Dairy	Gas	Petroleum	Shipbuilding
Automobile	Drug	Glass	Potash	Shoe
Baking	Electrical	Laboratory	Pulp & Paper	Smelting
Bleaching	Explosives	Laundry	Quarrying	Soap
Boiler Works	Farm Machinery	Leather	Railroad	Soft Drink
Brewing	Food	Meat Packing	Rayon	Sugar Refining
Canning	Foundry	Metal	Refrigeration	Textile
Ceramic	Furnace	Mining	Rubber	Tool
Chemical	Furniture	Paint	Sewage Works	Water Works

Industrial Products

SIZES—A range of standard sizes from 3 to 36 in. inside diameter and a wide variety of fittings (also made of Transite) adapt this pipe to even the most complex venting systems. Tapered end pipe, for use with tapered couplings, is furnished in diameters from 3 to 12 in. inclusive. Plain end pipe (untapered) is furnished for the other types of couplings (see below) and is made in diameters from 3 to 36 in. inclusive. Dimensions and weights are as follows:

Dimensions and Weights of Transite Pipe				
Inside Diameter, inches	Length, feet	Outside Diameter, inches	Wall Thickness, inches	Weight, lb. per foot
3	10	3.64	.32	3.5
4	10	4.64	.32	4.5
6	10	6.70	.35	7.3
8	13	8.80	.40	11.2
10	13	10.80	.40	13.9
12	13	12.90	.45	18.4
14	13	14.90	.45	18.8
16	13	17.00	.50	23.6
18	13	19.00	.50	26.6
20	13	21.10	.55	32.6
24	13	25.20	.60	42.7
30	13	31.34	.67	59.4
36	13	37.50	.75	79.5

TRANSITE COUPLINGS—These are made of asbestos and cement and afford the same corrosion resistance as the pipe itself. Sleeve, Ribbed and Simplex couplings (in sizes from 3 to 36 in. inside diameters) and Split and Bolted couplings (in sizes from 12 to 36 in. inside diameters) are furnished for pipe with plain (untapered) ends. Tapered, Duplex and Reducer couplings (in sizes from 3 to 12 in. inside diameters) are furnished for pipe with tapered ends.

TRANSITE FITTINGS—Many types of standard fittings are available. These include 45° and 90° elbows, long and short tees, laterals, reducers, crosses and caps.

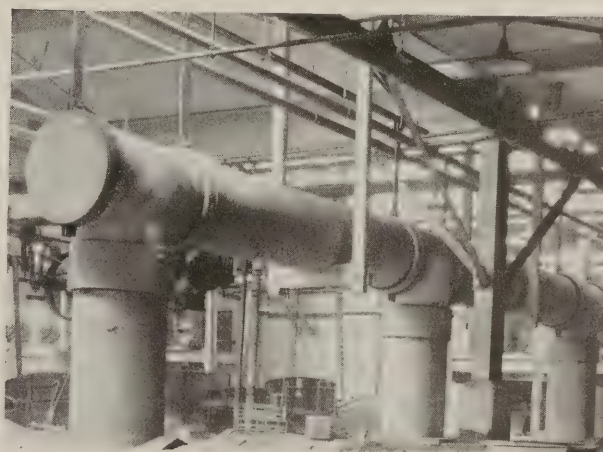
For more detailed information, write for brochure Data Sheet Series 336.

TRANSITE INDUSTRIAL VENT PIPE

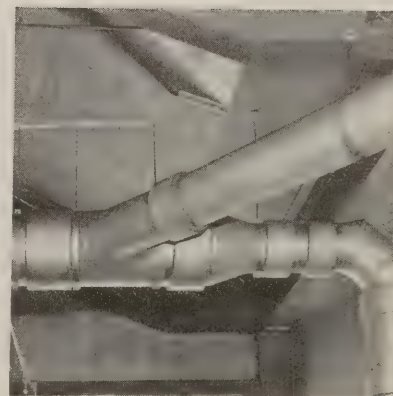
For Vents, Ducts and Stacks



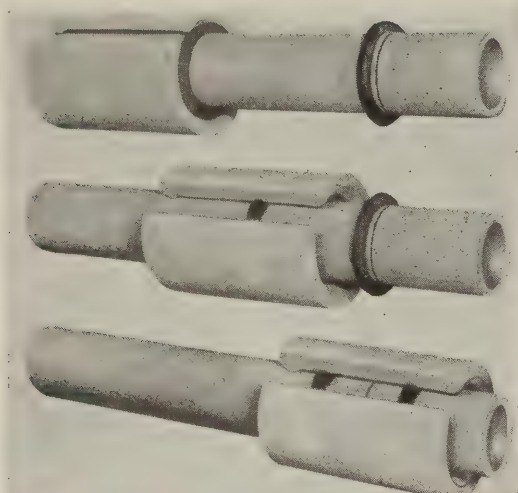
Venting process fumes in a large industrial plant with Transite Industrial Vent Pipe and Fittings



The corrosive fumes from eight plating tanks are vented with Transite Industrial Vent Pipe in this plant



The above installation shows a few of the many Transite fittings and couplings which adapt this pipe to virtually any type of venting system



Simplex Coupling with sleeve cut to show how rubber rings are compressed between sleeve and pipe. Top: Start of assembly. Center: Sleeve pulled over one ring. Bottom: Final position with sleeve centered over joint



An installation of Transite Pressure Pipe for an industrial water line



One of many cities where Transite Pressure Pipe is providing efficient, economical water transportation.

TRANSITE PRESSURE PIPE

For water supply and fire lines

The wide use of Transite Pressure Pipe for water supply and fire lines by thousands of industrial plants and municipalities throughout the country is a result of Transite's many outstanding advantages.

Made of asbestos fibre and cement formed under tremendous pressure into a dense, homogeneous structure, Transite Pressure Pipe is strong, durable, and resistant to the destructive agencies that often shorten pipe line life and necessitate costly maintenance and replacement expense.

Some of the advantages contributing to the efficient, economical performance of Transite Pressure Pipe are:

HIGH FLOW CAPACITY—FREEDOM FROM TUBERCULATION (INTERNAL CORROSION)—This is an advantage which has contributed to lower pumping costs and reduced pipe line maintenance for many industrial users of Transite Pipe. Because of Transite's non-metallic composition, its unusually high flow coefficient ($C = 140$) can never be reduced by tuberculation. Progressive reduction of delivery capacity due to this costly and troublesome form of internal corrosion is therefore never a problem in a Transite line. Periodic cleaning to remove tubercles is not necessary.

HIGH RESISTANCE TO SOIL CORROSION—A factor which sometimes shortens the life of ordinary pipe and contributes to its high maintenance is the corrosive action of aggressive soils. Transite Pipe, because of its special asbestos-cement composition and low free-lime content, is unusually resistant to soil corrosion. Many installations in cinder fills, salt marshes and other aggressive soils testify to its ability to render economic service with reduced maintenance.

TIGHT, FLEXIBLE JOINTS—The Simplex Coupling used on Transite Pressure Pipe lines consists of a Transite sleeve and two rubber rings. It can be rapidly assembled by unskilled labor with the help of a simple coupling puller. The Simplex Coupling forms a tight joint which protects against leakage and washing away of supporting soil with consequent undermining of the pipe. Its flexibility guards against vibration and stresses transmitted by the soil. And, when pipe must be laid around long sweeps, no special fittings are required. Deflections of as much as 5° are possible at each joint.

EASY TO HANDLE AND INSTALL—Important economies in handling and installation are other advantages which Transite offers the industrial user. Its light weight permits more footage to be carried per truck load and means that fewer men are required for unloading and placing the pipe in the trench. All but the largest sizes of Transite Pipe can be handled without the aid of mechanical equipment.

The Simplex Coupling assures rapid assembly, even by inexperienced crews. This not only reduces the length of time the trench must be kept open, but often makes it possible, where a trenching machine is used, to lay the pipe as fast as the machine can do its work. And, trenching costs are low with Transite. No bell holes are required at the joints, and width of trenches is kept to a minimum.

SIZES AND PRESSURES—Transite Pressure Pipe is furnished in sizes ranging from 3 in. to 36 in.—inside diameter—in standard 13-ft. lengths. It is manufactured in four pressure classes: 50, 100, 150 and 200 for maximum recommended working pressures of 50, 100, 150 and 200 lbs. per sq. in. respectively.

For more detailed information on Transite Pressure Pipe write for Brochure TR-11A.

CLASSES, SIZES AND APPROXIMATE WEIGHTS OF TRANSITE PRESSURE PIPE (lb per linear foot including coupling and rubber rings)

Class (maximum recommended working pressure in lb. per sq. in.)	Equivalent head, feet of water	Nominal Inside Diameter, in.												
		3	4	6	8	10	12	14	16	18	20	24	30	36
50	115	3.9	5.2	8.3	12.6	16.5	21.3	26.8	33.0	38.6	45.6	60.1	96.2	136.0
100	231	4.2	5.5	8.5	12.8	21.3	29.4	39.3	50.4	62.5	76.4	107.5	164.2	230.5
150	346	5.0	6.7	11.6	18.0	29.9	41.1	55.5	69.8	87.2	106.8	152.1	241.7	346.5
200	462	7.3	9.3	16.6	25.2	39.7	52.7	71.7	93.8	119.6	149.2	213.3	333.0	466.8

TRANSITE PRESSURE PIPE

For process lines

In a broad range of applications where process liquids are conveyed, Transite Pressure Pipe has effected important economies in low pumping costs, increased service life and reduced maintenance for the user. Some of the important advantages of this asbestos-cement pipe include:

CORROSION RESISTANCE—From the standpoint of corrosion resistance, the performance of any pipe material used for process lines naturally depends on the nature of the liquid handled. For many conditions, it has been the experience of users that Transite affords a degree of corrosion resistance which makes this pipe a sound economic choice. In many plants Transite's resistance to internal rusting and scaling has resulted in important savings in operating and maintenance costs. Many operators find that lines stay cleaner and flow more freely.

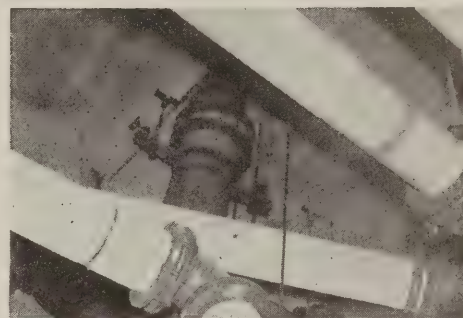
In handling waste liquids, too, Transite Pressure Pipe provides unusual corrosion resistance. In the mining industry, it has established many records for long life and economy in handling corrosive mine waters, with the result that many mine operators today measure the service life of their pipe in years instead of in months.

HIGH CARRYING CAPACITY—Transite has a smooth interior surface which affords minimum resistance to the flow of liquids. Its carrying capacity has a value of $C=140$ (Williams and Hazen coefficient). In many instances, this high carrying capacity has proved a valuable advantage in reducing scaling and in keeping pumping costs at a minimum. Moreover, because of Transite's asbestos-cement composition, its carrying capacity can never be reduced by tuberculation (a form of internal corrosion). This is an important factor where tuberculating waters are conveyed through process lines.

TIGHT JOINTS—Various types of couplings are available to suit the particular requirements of each installation and to provide the tight joints so essential in the handling of process and waste liquids in various industries. In oil field service, for example, where salt water must not be allowed to leak into the soil to destroy its fertility or cause pollution, operators have found Transite's tight joints the answer to the problem of underground leakage.

SIZES AND WEIGHTS—Dimensions and approximate weights of Transite Pressure Pipe are furnished in the table above.

FOR FURTHER INFORMATION—More detailed information is available on request. Inquiries should specify the service involved.



Transite Pipe, used for stock lines, guards against sliming ... helps keep paper stock clean.



Transite Pressure Pipe is used extensively in the oil industry for salt water disposal lines because it provides exceptional resistance to corrosion



In the mining industry, Transite Pressure Pipe has established many records for long life and economy in handling corrosive mine waters

THE RIGHT PACKING FOR ANY SERVICE

The right packing is as important to continued trouble-free machine operation as any other single factor. With a background of long experience in the field of industrial packing, plus complete manufacturing and research facilities, Johns-Manville offers the packing user a complete selection of packing types and styles engineered to meet any service condition. The services of the Johns-Manville Engineering staff are available at all times to assist you in the solution of your packing problems and in the selection of the packing that will assure maximum service with fewer shutdowns of equipment for replacement.

Throughout the country, in all important industrial centers, there are 400 Johns-Manville Packing Distributors who stock J-M Packings in many forms and styles. Whatever the type of packing you need, the J-M Distributor near you is ready at all times to supply the right one for the job.

Note—In each case, the first listing in the table below is the recommendation for the particular service, with the single exception of Sea Rings (described on next page). Sea Rings are the first recommendation for any service and condition under which they can be used.

TABLE OF RECOMMENDATIONS

Service	TYPE OF RODS		Valve Stems
	Reciprocating	Centrifugal	
Steam Up to 500 F	#166 Kearsarge		#193 Mogul
Steam Under 350 F	#166 Kearsarge #171 Duro		#193 Mogul
Hot Water	#271 Cross Diagonal #255 Interlocked #171 Duro	#7 Centripac #255 Interlocked #360 Flexible Metallic #610 Plastic	#193 Mogul
Cold Water, Brine Over 500 lbs. Pr.	#245 Navalon #190 Navalon #188 Flax #240 Flax #280 Braided Copper End Rings	#11 Centripac #257 Interlocked	#193 Mogul
Cold Water, Brine Under 500 lbs. Pr.	#245 Navalon #190 Navalon #189 Flax #4191 Jute	#7 Centripac #255 Interlocked #360 Flexible Metallic #610 Plastic	#193 Mogul
Ammonia	#172 Besta-Monia #271 Cross Diagonal	#7 Centripac #255 Interlocked #360 Flexible Metallic	#193 Mogul
Oil	#223 Mogul #255 Interlocked	#7 Centripac #255 Interlocked #350 Flexible Metallic #360 Flexible Metallic #620 Plastic	#193 Mogul
Air	#166 Kearsarge		
Acid	#2017 Acid	#2018 Acid #640 Plastic #379 Flexible Metallic #645 Plastic	#2017 Acid #640 Plastic #379 Flexible Metallic #645 Plastic
Natural Gas Under 500 lbs.	#15 Kearsarge #223 Mogul		
Gasoline	#323 Gasoline Rod #361 Flexible Metallic	#323 Gasoline Rod #361 Flexible Metallic #351 Flexible Metallic	#323 Gasoline Rod #361 Flexible Metallic #351 Flexible Metallic
Caustic	#2020 Caustic	#2021 Caustic	
Piston Packings	#33 Universal #182 Aqua Packing Cups with suitable adapters		
SHEET PACKINGS AND GASKETS			
Steam, Gas, Water, Hot Oil, Air, Weak Acids	#60 Service Sheet	Boiler Manhole, Handhole & Tube Plate	#116 Kearsarge
Cold Oil, Gasoline, Grease	#711 Seigelite Sheet	Asbestos Rope	#4200 Rope #4196 Rope
Low Pressure Water	#107 Liberty Sheet	Asbestos Wick	#4202 Wick #4195 Wick

Industrial Products

SEA RINGS

For reciprocating rods and plungers

DESCRIPTION—Composed of laminated plies of asbestos fabric or duck or of a combination of the two (depending upon the nature of the service) impregnated with heat and oil resisting materials. They are custom-made to exact specifications, in composition and construction, for individual operating conditions. An important feature of Sea Rings is the flexible tapered lip. The action of this lip is entirely automatic in that it is held tightly to the rod on the work stroke by pressure of the fluid but is automatically released on the return—eliminating unnecessary friction, reducing wear on the rod and minimizing the amount of power required.

USE—For service against steam, hot or cold water, air, brine, vegetable and mineral oils, gasoline, kerosene and many other fluids and chemicals.

SIZE—Sea Rings are made for rods not less than $\frac{3}{4}$ in. and the width of packing space is not less than $\frac{5}{16}$ in. Furnished in sets only.

CENTRIPAC PACKING NO. 7

For centrifugal pumps and other rotating and oscillating rods and shafts.

DESCRIPTION—Made by plaiting (square braiding) long fibre asbestos yarn; thoroughly lubricated and graphited. The square cross section and type of braiding provides a full surface contact between the moving part and the packing, giving a tight seal and minimum friction.

USE—For packing centrifugal pumps and other rotating and oscillating rods and shafts in service against fresh and salt, hot and cold water, oil, ammonia, brine, gasoline and some weak acids and chemicals.

Sizes	How Furnished
$\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in.	Coil or ring form.

CROSS DIAGONAL ROD PACKING NO. 271

For reciprocating rods and plungers

DESCRIPTION—Made of plies of quality duck, laid diagonally, bonded with a high grade rubber compound and graphited. Its diagonal construction allows expansion in either direction.

USE—Designed for service on reciprocating rods or plungers against hot or cold water, low-pressure steam, ammonia, light oils and mineral seal oil where the packing space is $\frac{1}{4}$ in. or more.

Sizes	How Furnished
$\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in.	Coil, Spiral or Ring form

NAVALON PACKING NOS. 190 AND 245

For reciprocating and low speed centrifugal pumps.

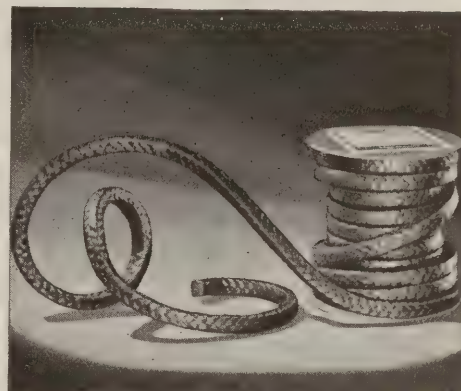
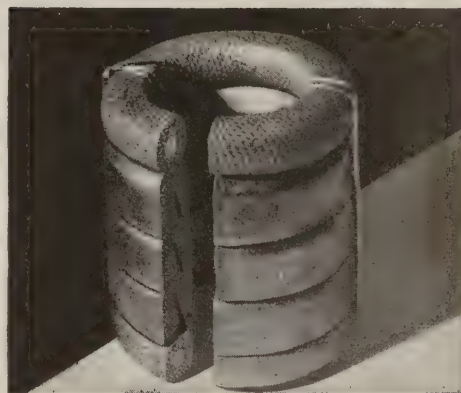
DESCRIPTION—Made from a specially processed fibre—plaited (square braided). Navalon is impregnated by an exclusive J-M process, which eliminates any deterioration due to grease, dirt or other foreign material. It is a strong, rot-proof and abrasive-free packing. Conforms readily to stuffing box conditions providing a tight seal with minimum gland pressure.

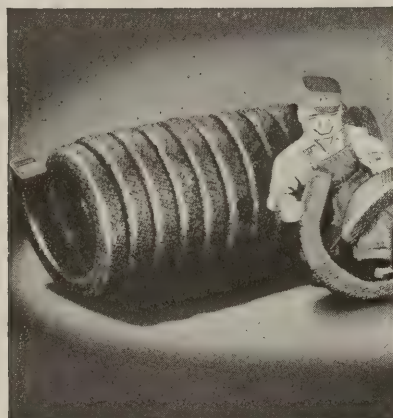
USE—For reciprocating service against cold water, oil or brine.

Sizes	How Furnished
From $\frac{1}{4}$ in. to $2\frac{1}{2}$ in. in $\frac{1}{8}$ " increments.	In coil, spiral or ring form. Standard without graphite. When specified a graphite finish can be supplied.

PACKINGS

Rods and Plungers





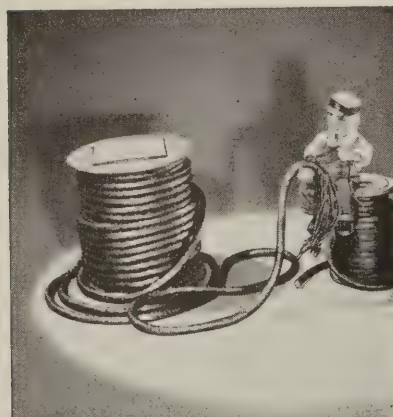
KEARSARGE ROD PACKING No. 166

For reciprocating rods and plungers

DESCRIPTION—Made with an accordion-folded center block of asbestos cloth and a non-hardening rubber expansion back. Over this center block is wrapped a double wearing surface of asbestos cloth. With the folds parallel to the axis of the rod, this construction provides a naturally resilient structure and also acts as a reservoir for the preserving lubricant. (In sizes $\frac{3}{16}$ in. and under, a center core of asbestos replaces the accordion-folded block.)

USE—Recommended for use on reciprocating rods of steam engines, pumps, compressors and similar equipment where the packing space is $\frac{3}{8}$ in. and more. Used for service against high pressure steam at temperatures up to 500 F. May also be used against air and gas.

Sizes	How Furnished
$\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in.	Coil, Spiral or Ring form.



MOGUL PACKING Nos. 193, 222 AND 223

For valve stems, reciprocating rods and centrifugal pumps

DESCRIPTION—Mogul Packings are manufactured both round and square, in braided and twisted styles. They are made of a combination of long-fibre asbestos yarns, lubricated and graphited.

USE—Designed for service against steam, air, water, ammonia, oil and chemicals. No. 193 (twisted) is a handy packing for general conditions on valve stems. By simply untwisting the strands, packing of any desired size may be obtained. Nos. 222 (round) and 223 (square) are recommended for packing small stuffing boxes in reciprocating and centrifugal service. Style 223 is recommended where a flat-bodied packing is preferred.

Sizes	How Furnished
No. 193— $\frac{1}{16}$ in. and up	(Twisted Round) In coil form only
No. 222— $\frac{1}{8}$ in. and up	(Braided Round) In coil form only
No. 223— $\frac{3}{16}$ in. and up	(Braided Square) No. C-223, coil form and No. R-223, ring form.



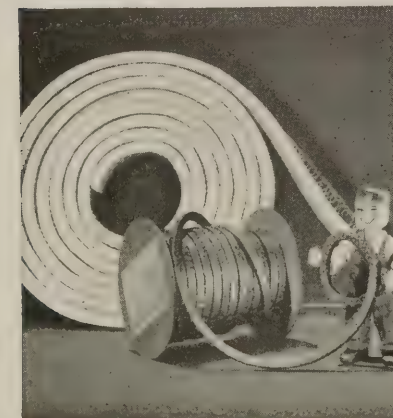
INTERLOCKED BRAIDED ASBESTOS PACKING No. 255

For reciprocating or rotating service

DESCRIPTION—A unique method of braiding asbestos yarn, exclusive with Johns-Manville, is employed in the construction of Interlocked Packing. There are no jackets to wear through or come apart . . . no plaits to become loose. Long fibre asbestos yarns braided square, (not pressed into shape) extend back into the body of the packing and are strongly interlocked for a solid integral structure that cannot ravel or come apart in service. It provides a better contacting area . . . gives a tight, resilient seal with minimum gland pressure and take-up.

USE—For either reciprocating or rotating service against saturated or superheated steam up to 500 F.; hot or cold, fresh or salt water, oils, weak acids and caustics.

Sizes	How Furnished
$\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in.	Coil or Ring form.



PLASTIC PACKINGS

For modern high speed centrifugal service

DESCRIPTION—Made of selected asbestos fibres combined with such materials as graphite, mica, lubricants, non-friction metals of certain types and binding compounds. All J-M Plastic Packings are adaptable to both reciprocating and rotating service and are specially designed for high speed centrifugal operation.

USE—Plastic Packings are made in six styles: Nos. 610 and 615 (no metal) are used for service against steam, air, water, ammonia, gases, up to 600 F.; No. 620 for oil and gasoline service, both hot and cold; No. 630 for equipment handling food products, alcohol, caustics, weak organic acids; No. 640 for such acids as sulphuric or sulphurous and No. 645 (no lead) for packing against acids that react to lead.

Sizes	How Furnished
$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, and $\frac{7}{8}$ in.	In coil form except No. 620 which is furnished in spiral form.

Industrial Products

FLEXIBLE METALLIC PACKINGS

For centrifugal pumps and reciprocating rods and plungers

DESCRIPTION—Flexible metallic packings are made in many different styles including all-metallic and semi-metallic. An important use of flexible metallic packing is as end rings in combination with other types of packing such as plastic where speeds exceed 1750 R.P.M. They are made to withstand severe service under high pressure and high temperature conditions on all types of reciprocating and rotating rods, shafts and plungers in good mechanical condition. Should never be used against rods or shafts made of brass or bronze. The temperature limit is 500 F.

USE—Nos. 360 and 350 for hot or cold water, oil, etc. Nos. 361 and 351 for service against gasoline and distillates. No. 379 is for acid pumps in service against sulphuric and sulphurous acid.

Sizes	How Furnished
Nos. 360, 361 and 379 in $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in.	Nos. 360, 361, and 379 in spiral and ring form.
Nos. 350 and 351 in the same sizes as above except $\frac{3}{16}$ in.	Nos. 350 and 351 in coil and ring form.

UNIVERSAL PISTON PACKING No. 33

For pistons of inside packed pumps in all general service

DESCRIPTION—Composed of a layer of asbestos cloth and cotton duck, folded back and forth on each other to form a wearing surface of rigid shoulders which give greater flexibility and resiliency, and hence longer life.

USE—Designed for service against hot and cold water, brine, air and oil on inside-packed pumps where packing space is $\frac{3}{8}$ in. or more.

Sizes	How Furnished
$\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in.	Coil, Spiral or Ring form.

SERVICE SHEET PACKING No. 60

Industry's No. 1 sheet packing for all general service

DESCRIPTION—Made of long-fibre asbestos and heat-resisting compounds, bonded under pressure into a pliable and resilient sheet adaptable to all sheet packing purposes. It is graphited on one side only; the other surface is ruled in 1 in. squares to facilitate cutting to size. Service Sheet can be carried in storage indefinitely without deteriorating. It is uniform in quality and provides a tight, lasting seal with freedom from blowouts.

USE—For flanges and other parallel surfaces to pack against superheated or saturated steam, gas, oil, water, ammonia, etc.

Sizes	How Furnished
In thicknesses of $\frac{1}{64}$ to $\frac{1}{4}$ in.	In sheets 54 x 63, 54 x 126, 36 x 63, 36 x 126 and 108 x 126 in. (last size not furnished in $\frac{1}{64}$ in. thickness). Also furnished as cut gaskets in all standard and many special shapes.

KEARSARGE GASKETS Nos. 116 AND 118

For sealing boiler handholes and manholes and tube plates

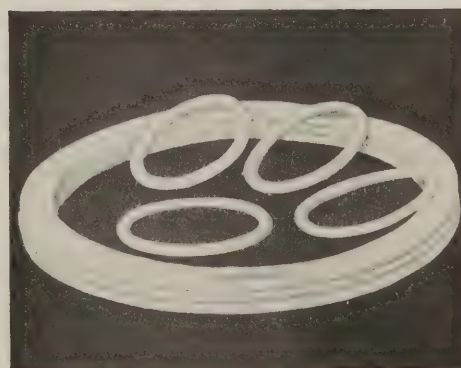
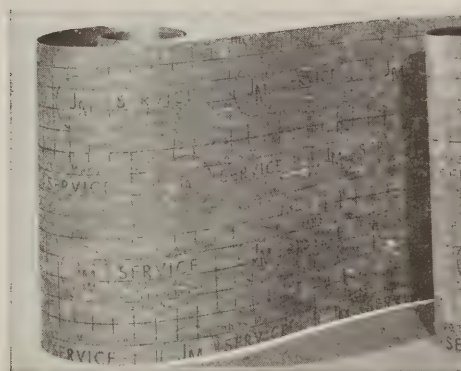
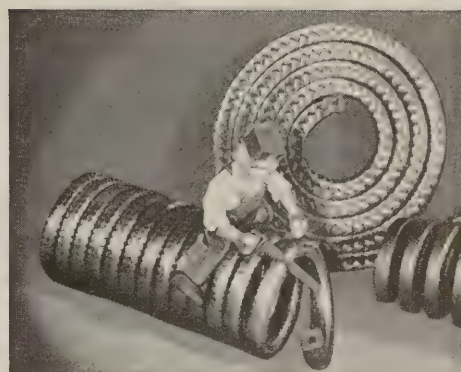
DESCRIPTION—No. 116 is made by folding and forming to the proper size and shape, plies of strong, durable, wire-inserted asbestos-metallic cloth, treated with a rubber heat-resisting compound. Edges of folds are on the inner side, while, on the outer side, where the gasket is exposed to pressure, there is an unbroken, rounded shoulder. May be used repeatedly, if properly applied. No. 118 is made seamless and without a joint. It is woven into tubular form from strong, wire-inserted asbestos yarn, treated with a rubber heat-resisting compound. A superior gasket for tube plate service.

USE—No. 116 for all manhole and handhole service. Kearsarge Tube Plate Gaskets No. 118 are particularly efficient when gaskets with a very narrow flange must be used.

Sizes	How Furnished
No. 116—Minimum flange width $\frac{3}{8}$ in. Thickness varies according to number of plies, each ply being approx. $\frac{1}{16}$ in. thick.	No. 116—Furnished in oval form to fit plate for which they are intended. Shapes other than oval furnished on order.
No. 118—In ordering, specify the size desired and the make of boiler upon which the gaskets are to be used.	

PACKINGS

**Rods, Plungers and
Valve Stems
Sheet and Gasket**

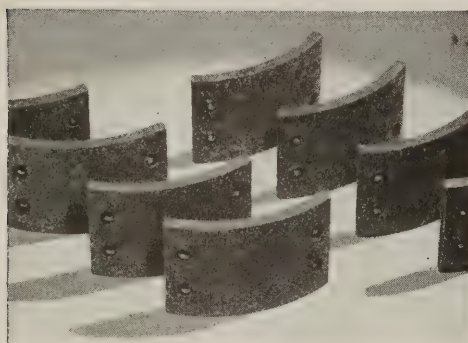


JOHNS-MANVILLE INDUSTRIAL FRICTION MATERIALS

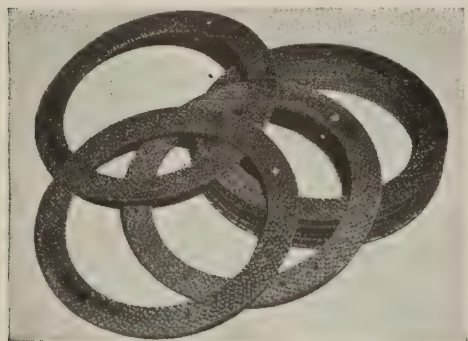
Linings, Facings, Blocks



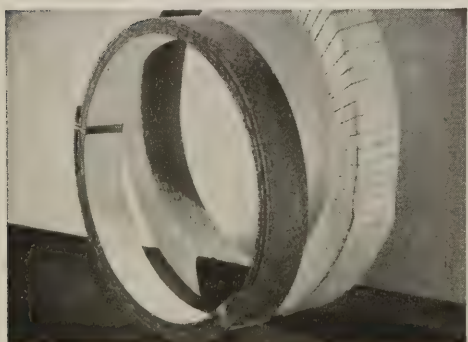
FOLDED AND COMPRESSED LINING



MOULDED FRICTION BLOCKS



WOVEN FACINGS



FLEXIBLE MOULDED LINING

Type	Style No.	Construction	Composition	Impregnation
Flexible Lining	600	Fold and Compressed	Brass Wire Inserted Asbestos Cloth	Heat Resisting Compound
	900	Woven and Compressed	Asbestos Yarn	Friction Compound
	300	Woven (Standard)	Brass Wire Inserted Asbestos Yarn	Heat Resisting Compound
	510	Woven (Heavy Duty)	Multi-metal wire ins. Asbestos Yarn	Resinous Compound
	232*	Moulded	Non-metallic	
	242*	Moulded	with Brass Particles	
Semi-Flexible Lining	400	Woven (Giant)	Multi-metal wire ins. Asbestos Yarn	Heat Resisting Compound
	304	Woven	Brass Wire Inserted Asbestos Yarn	Inorganic Oil Resisting Compound
	404	Woven	Multi-metal wire ins. Asbestos Yarn	
Semi-Rigid Lining	420	Woven and Compressed	Brass Wire Inserted Asbestos Yarn	Special
	410	Woven (Giant)	Multi-metal Wire ins. Asbestos Yarn	Heat Resisting Compound
Rigid Lining	230*	Moulded	Non-metallic	
	240*	Moulded	with Brass Particles	
Brake Blocks	135△	Moulded	Non-metallic	Oil Resisting Compound
	140△	Moulded	with Brass Particles	
Facings	350	Woven	Brass Wire Inserted Asbestos Yarn	Heat Resisting Compound
	354	Woven	Same as #300 except oil resistant	Oil Resisting Compound
	450	Cut from #400	Same as style #400	Heat Resisting Compound
	454	Cut from #400	Same as #400 except oil resistant	Oil Resisting Compound
	751	Cut from asbestos composition		Special

* These linings are provided with a reinforcing backing material, therefore, discs from this sheet are not suitable for floating disc clutches.
△ Can be moulded into discs and special shapes.

Insert type clutches: Blocks for these clutches can be made from block materials and some fabric structures.

Rivet Hole Plugs: designed to withstand high temperatures, reduce scoring tendencies by preventing particles of dirt and other erosive materials from accumulating in countersinks. Through their use the area of lining in contact with the drum is increased and unit pressure is reduced, thus increasing the life of linings and drums. Style 1200-S is furnished in stick form and style 1200-F in plug form made to correct size and thickness so that they will completely fill the countersinks.

HOW TO SELECT YOUR J-M FRICTION MATERIALS

This chart has been prepared to simplify the selection of friction materials.

To illustrate the manner of using the chart, let us assume the following example: An external contracting band type clutch requiring a lining 6 in. wide operating under average loading and the following conditions; Rubbing speed 3,000 feet per minute; $\frac{3}{8}$ in. thick friction material; dry operation; pressure 75 lbs. per square inch; coefficient of friction 0.40; 500 deg. F. drum temperature; constant operation.

The friction material selected must have a good rate of wear and a moulded type material is desired.

The chart lists 13 styles of friction materials suitable for band type clutches. Our selection, therefore, lies with Styles 135, 140, 230, 232, 240, 242, 300, 304, 400, 404, 510, 600 and 900, and since $\frac{3}{8}$ in.

thick material is specified this eliminates Styles 135, 140, 300 and 304.

Requirements for dry operation eliminates Style 404, leaving Styles 230, 232, 240, 242, 400, 510, 600 and 900 to consider, all of which are suitable for 75 lbs. pressure.

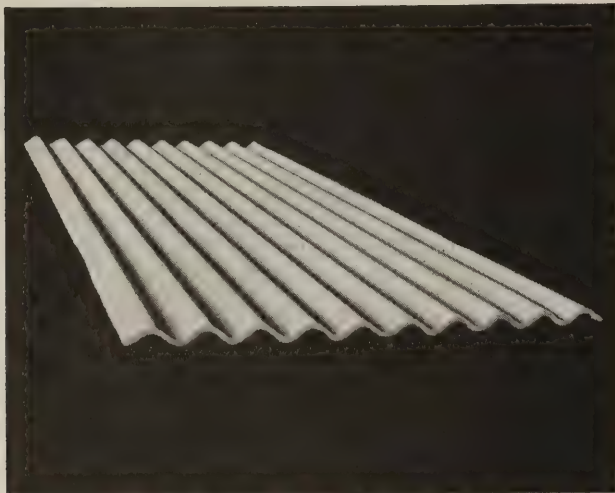
Drum temperature of 500 deg. F. further eliminates Style 600.

The ultimate selection would then lie between Styles 230, 232, 240, 242, 400, 510 and 900. The preference expressed for a moulded structure eliminates Styles 400, 510 and 900, leaving Styles 230, 232, 240 or 242 as final choice. Style 240 or 242, depending on whether a rigid moulded or semi-flexible moulded is required, would be indicated as final selection due to the metal particle content which gives a slightly better wear factor and somewhat more stabilized friction than Style 230 or 232.

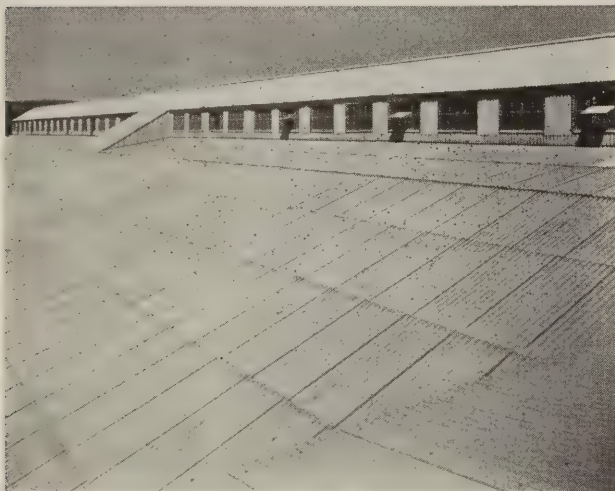
Johns-Manville FRICTION MATERIALS SELECTION CHART																						
JOHNS-MANVILLE PRODUCTS		STYLE NO.	135	140	230	232	240	242	300	304	350	354	400	404	450	454	510	600	751	900		
TYPE OF BRAKE OR CLUTCH			DISC CONE BAND	DISC CONE BAND	DISC CONE BAND	CONE BAND	DISC CONE BAND	CONE BAND			DISC CONE	DISC CONE			DISC CONE	DISC CONE		DISC CONE BAND	DISC	DISC CONE BAND		
TYPE OF SURFACE																		†	†		†	
(Furnished standard with ground surface)																						
STRUCTURE																						
R—Rigid Moulded SF—Semi Flexible F—Flexible			R	R	R	SF	R	SF	F	F	F	F	SF	SF	F	F	F	SF	R	SF		
COEFFICIENT OF FRICTION																						
Running in oil			0.25 ±.05	0.40 ±.07	0.45 ±.07	0.45 ±.07	0.40 ±.07	0.40 ±.07	0.40 ±.07	0.20 ±.07	0.35 ±.07	0.20* ±.07	0.45 ±.07	0.20* ±.07	0.45 ±.07	0.20* ±.07	0.45 ±.07	0.35 ±.07	0.35 ±.07	0.40 ±.07		
SIZES	FACINGS	THICKNESS	Note 1		3/16"-3/8"		3/16"-3/8"				1/8" to 5/16"				3/8"-1"		3/8"-1"		1/8"-1"		1/8"-1/2"	1/4"-3/8"
		MAX. DIAM.	35"	35"	38"		38"					24"	24"			12"	12"		36"	36"	Note 2	
	BAND OR BLOCKS	THICKNESS	7/16" to 4"		3/16" to 3/8"				1/8" to 5/16"						3/8"-1 1/4"		3/8"-1"		3/16"-3/8"		1/8"-1"	1/4"-1/2"
		WIDTH	1" to 24"—600 sq. in. max.						1" to 24"						2" to 12"				1 1/2"-8"		1"-24"		1 1/2"-8"
TYPE OF SERVICE			DRY	DRY	DRY	DRY	DRY	DRY	DRY	OIL	DRY OIL	OIL	DRY	OIL	DRY OIL	OIL	DRY	DRY	DRY OIL	DRY		
MAX. RUBBING SPEED FT/MIN			5000	7500	5000	5000	5000	5000	5000	5000	5000	3000	7500	5000	3000	3000	7500	3000	5000	5000		
MAX. DRUM TEMP. °F FOR CONSTANT OPERATION			750	750	500	500	500	500	250	500	500	500	500	500	500	500	500	250	500	500		
			For short periods of operation will withstand an additional 250° F																			
MAX. PRESSURE—P.s.i.			150	150	100	100	100	100	50	100	100	50	100	100	100	100	100	100	100	100		
RESISTANCE TO SHOCK																						
M—Medium G—Good E—Excellent			E	E	G	G	G	G	M	M	G	M	G	M	G	M	G	E	G	G		
RATE OF WEAR																						
M—Medium G—Good E—Excellent V—Variable			E	E	E	E	E	E	M	V	G	V	G	V	G	V	G	E	G	E		

Note 1—Full moulded to 1/2" thick and 35" O.D. Saw cut from slab over 1/2" thick to 2 1/2" thick and max. O.D. of 24".

Note 2—1/4" thick-24" diam. Max. over 1/4" thick to 1/2" thick-12" diam. Max.



Corrugated Transite is composed of asbestos fibre and cement. This durable material can be applied to any skeleton-frame structure



Note how adaptable Corrugated Transite is to roof construction where monitors and penthouses project from main roofing area



An administration office in a northern chemical plant with sidewalls of Corrugated Transite

CORRUGATED TRANSITE

For roofing and siding

DESCRIPTION—Strong, fireproof and highly corrosion resistant, Corrugated Transite sheets have been widely used for many years as roofing and siding on industrial buildings over skeleton frame construction. Like other Transite products, they are made of asbestos fibre and cement, formed under tremendous pressure into a homogeneous, dense sheet of great strength, toughness and durability.

Because of its unusual strength, Corrugated Transite can be laid on purlins spaced 54 in., and on girts spaced 66 in.

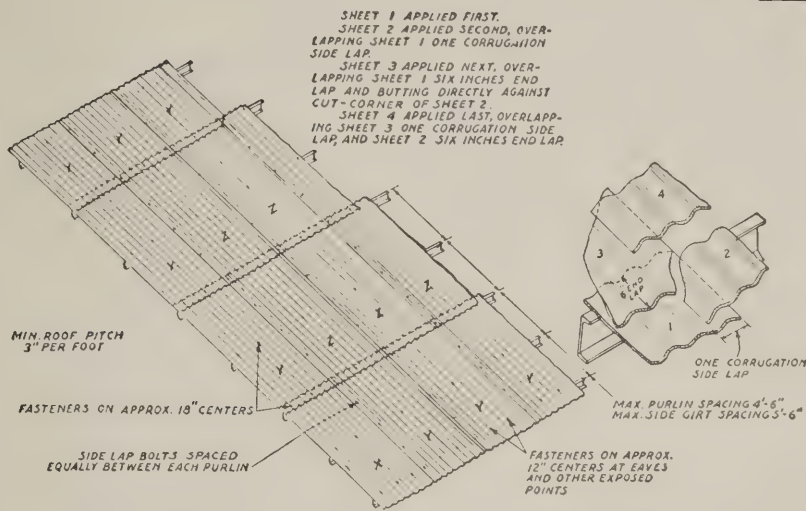
In addition to its structural advantages, Corrugated Transite is highly resistant to acid fumes, alkaline vapors and adverse atmospheric conditions. It will not burn, rot, corrode or shrink. It assures long building life with unusually low per annum cost.

Corrugated Transite is as easily applied, and in the same manner, as any other corrugated roofing or siding material. However Transite has the great economical advantage of needing no painting or periodic maintenance to preserve it. Where panel wall construction is used, practically complete salvage is possible.

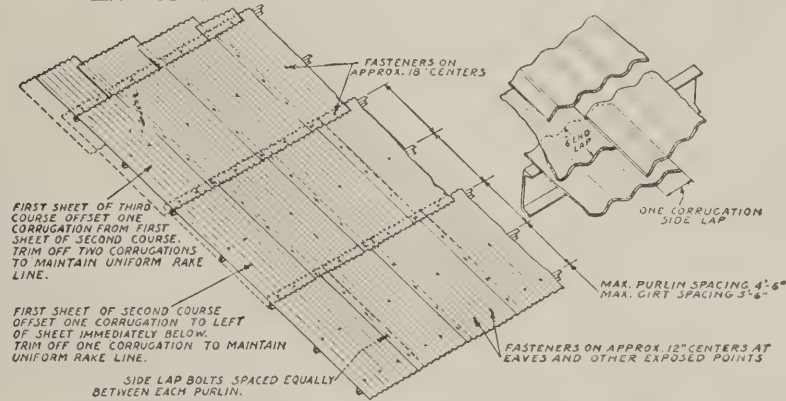
USE—For oil refinery aprons and roofs over stills, and for housings of various types; railroad round houses, car shops, switch towers and freight houses; mining and quarrying roofing and siding for hoist houses, loader and crusher sheds, storehouses, etc.; chemical and metallurgical industries; warehouses; docks; aircraft hangars; exposition buildings and employee houses.

Size	How Furnished
42 in. wide, in any length to 11 ft.	* Corrugated Sheets: 4.2 in. pitch, 1½ in. depth, ⅞ in. thick at ridge and valley, ⅝ in. on tangent. Weight 4.9 lb. per. sq. ft. crated.
Furnished on special order	† Curved Or Special Sheets: Minimum radius when curved lengthwise with arc parallel to length, 60 in. Minimum radius when curved crosswise with arc parallel to width, 24 in. * For use with Corrugated Transite, the same material is furnished in ridge and corner rolls, and louvres. † Sheets may be curved either way but not in combination.

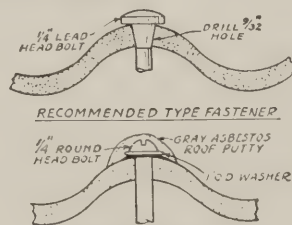
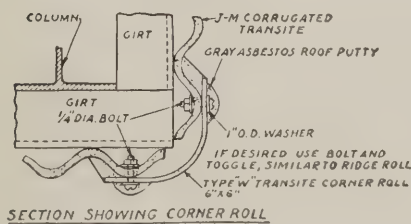
Corrugated Transite Construction Details



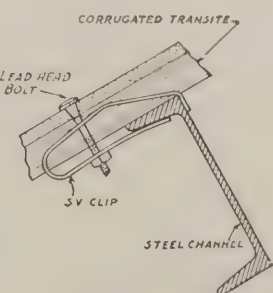
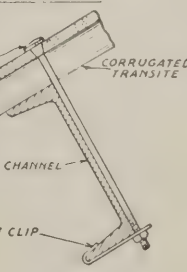
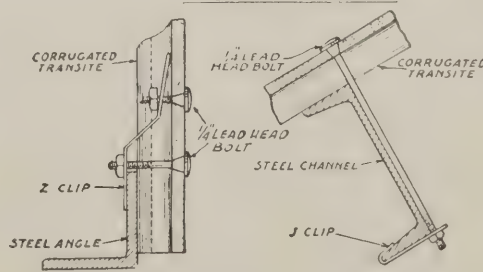
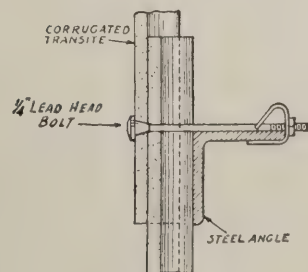
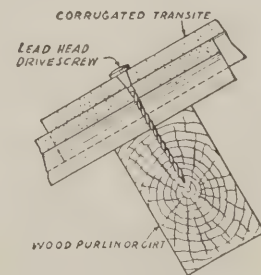
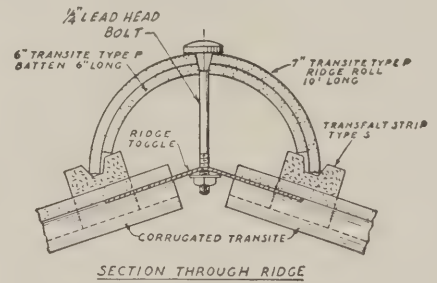
STRAIGHT LAP LINE CONSTRUCTION WITH CUT-CORNER SHEETS



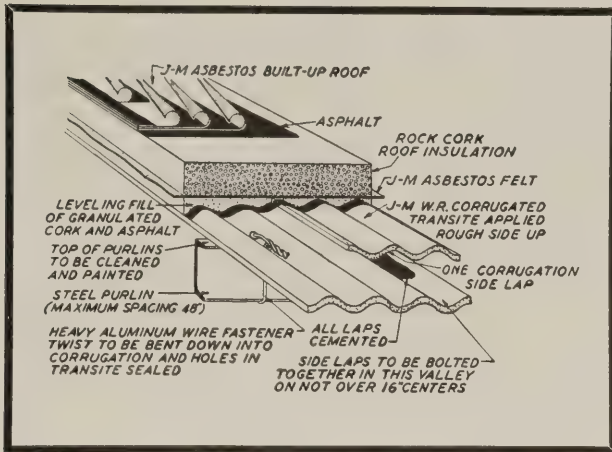
STAGGERED JOINT CONSTRUCTION WITH SQUARE-CORNER SHEETS



ALTERNATE TYPE FASTENER



NOTE: For 2 5/8-in. pitch Corrugated Transite, the correct side lap is two corrugations and the maximum spacing for purlins is 4 ft. and for girts, 5 ft.



Rot-proof Insulated Roof construction details

ROT-PROOF INSULATED ROOF

DESCRIPTION—The J-M Rot-proof Insulated Roof was originally designed to withstand severe moisture, heat and acid conditions encountered over the machine room in paper mills. Fastened directly to the steel purlins, its erection presents no unusual problems, it being designed specifically for application over skeleton frame construction.

The J-M Rock Cork Insulation, of the proper thickness, prevents the deposition of moisture under the calculated humidity conditions. The impregnated, asbestos-cement Transite deck, which cannot rot, serves as a lasting factor of safety for unforeseen temperature differences. While the problem of rot alone could be eliminated by the use of concrete, condensation and roof-drip remain. The J-M Rot-proof Insulated Roof meets all the difficulties satisfactorily.

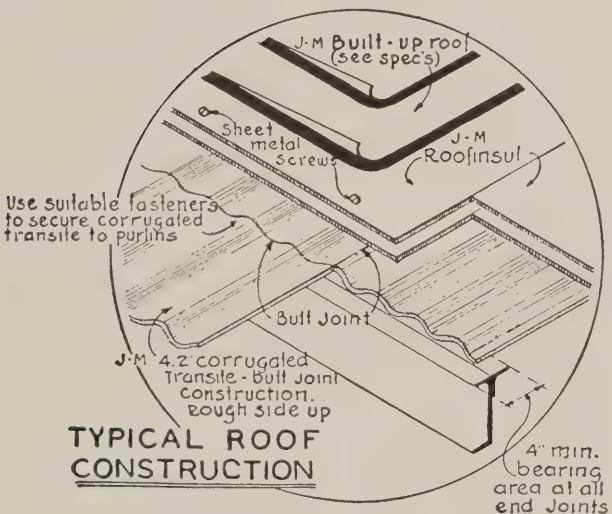
USE—For machine rooms in paper mills and other industrial applications where similar conditions prevail.

TRANSITE INSULATED ROOF

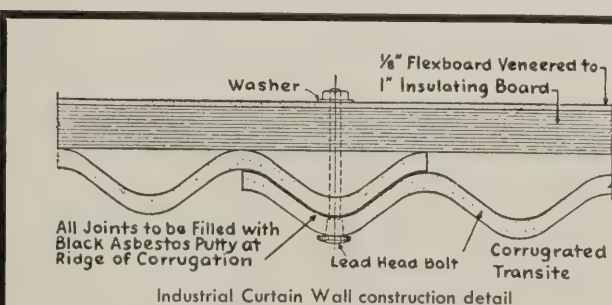
DESCRIPTION—The J-M Transite Insulated Roof has given satisfactory service under widely varying climatic conditions. This construction uses, as the roof deck, Corrugated Transite over which is applied a minimum of two $\frac{1}{2}$ -in. layers of J-M Roofinsul, stapled or cemented together with a $\frac{3}{4}$ -in. shi lap on all edges, which serves as a base for a standard J-M Built-up Roof.

The Corrugated Transite, laid rough side up, is bolted to the purlins with butt joints at all edges, and a minimum of two $\frac{1}{2}$ -in. layers of Roofinsul applied over it with all joints staggered, the three layers being bolted together as a unit deck. Maximum purling spacing 36 in. Large washers are used under the bolt heads and the bolts drawn tightly enough to imbed the heads slightly and leave a flat upper surface. Over the Insulating Board, the type of J-M Built-up Roof selected is applied in accordance with standard J-M specifications. Detailed drawings of the Transite Insulated roof are available on request. Write for DS Series 168.

USE—For roof insulation where condensation conditions are not as severe as in the case of Rot-proof Insulated, and where a less expensive construction is desired.



Construction details of the Transite Insulated Roof



Industrial Curtain Wall construction detail

INDUSTRIAL CURTAIN WALL

DESCRIPTION—The present trend in industry toward lightweight construction has been met by Johns-Manville with a new design of curtain wall which is erected in the modern "dry wall" manner.

The J-M Curtain Wall consists of an interior wall of J-M Encased Insulating Board, faced with J-M Asbestos Flexboard, and an exterior wall of J-M Corrugated Transite. Both inside and outside surfaces of the curtain wall are a pleasing light gray color. No painting is required to preserve the materials, though they may easily be painted, if desired, for decorative effect.

In this construction, insulating value equivalent to approximately 14-in. of masonry wall is attained through the use of a 1-in. thick core of J-M Insulating Board, securely bonded at the factory to the interior wall facing. Additional insulation may be provided by specifying a thicker Insulating Board core.

Industrial Products

STANDARD FLAT TRANSITE SHEETS

DESCRIPTION—Made of J-M Transite in flat sheets, this material has a wide variety of industrial applications.

USE—As a casing for industrial furnaces and boilers; ceilings, walls, panels, partitions and fire doors in building construction; arc barriers and cell structures in electrical work where high dielectric strength is not required; dryer housings, hoods, dampers, baffles and ducts in various industrial processes.

Size	How Furnished
$\frac{1}{8}$ to 2 in.	* Sheets: 36 x 48 in., 42 x 48 in.
$\frac{1}{4}$ to 2 in.	Sheets: 48 x 48 in., 42 x 96 in., 48 x 96 in.
	* Also furnished in core plates, ducts, forge jacks, smoke jacks, ventilators, etc.

W. R. TRANSITE SHEETS

DESCRIPTION—Both flat and corrugated W. R. Transite sheets can be furnished with a bituminous impregnation to afford maximum impermeability where the material will be subjected to extreme or sustained moisture or acid conditions. Not available until further notice.

USE—For industrial use.

†W. R. FLAT TRANSITE	
Size	How Furnished
$\frac{1}{4}$ in.	* Sheets: 42 x 96 in.
$\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ in.	Sheets: 42 x 48 in.
$\frac{1}{8}$, $\frac{3}{16}$ in.	Sheets: 36 x 48 in.
	* Other sizes and thicknesses furnished on special order. † W. R. Corrugated is furnished in sheets 42 in. wide in the same lengths as standard 42 in. Corrugated Transite up to 8½ ft.

TRANSITE CORE PLATES

DESCRIPTION—Transite Core Plates are strong, durable, smoothly sanded, flat trays of asbestos and cement, specially compounded and treated. They have been preferred to steel or iron plates by many foundries and concerns manufacturing castings of brass, aluminum, gray iron, malleable iron and steel because of the advantages due to the peculiar properties of the material.

Transite Core Plates weigh about one-fourth as much as an iron or steel plate of the same size and thickness. They cannot rust or corrode and maximum warpage is not more than $\frac{1}{64}$ in. in 24 in. Initial low cost plus longer life and usability on both sides provide outstanding economical advantages.

Furnished in thicknesses from $\frac{1}{4}$ to 2 in., in stock sizes from 6 x 6 in. to 48 x 60 in. Corners are rounded to a radius equal to the unit thickness.

Perforated Core Plates are also available and are of special advantage where cores of large mass and small surface area are required.

USE—For baking and drying cores.

TRANSITE SLIP JACKETS

DESCRIPTION—The Transite Slip Jacket is improving foundry practice wherever adopted. Composed of asbestos and cement, the Transite Slip Jacket is light in weight and effectively withstands heat shock. It is extremely durable, assuring long service. A Transite Slip Jacket will not burn and despite runouts or spillovers it will retain its original shape (warpage does not exceed $\frac{1}{32}$ in. in 24 in. length).

OTHER TRANSITE PRODUCTS

Flat Sheets, Core Plates, Slip Jackets, Pal-Lite, Pallets

The Transite Slip Jacket is furnished accurately cut to size and shape for assembly by the customer who furnishes his own hardware to assemble the finished jacket.

USE—To protect molds during the pouring process.

How Furnished	
In $\frac{3}{8}$ in. thickness up to 20 in. in length	
In $\frac{3}{4}$ in. thickness up to 30 in. in length	
In $1\frac{1}{4}$ in. thickness up to 40 in. in length	

PAL-LITE AND TRANSITE PALLETS

In ceramic plants, the rate of drying and warpage are important factors in the treatment of ware preliminary to firing. Both the drying rate and warpage control are closely associated with the type of pallet material used. For this service, Johns-Manville manufactures two smoothly sanded asbestos sheet materials, similar in many respects but differing from each other sufficiently in physical properties to meet a wide range of conditions. These are Pal-lite and Transite Pallets.

PAL-LITE

DESCRIPTION—Pal-lite, a new, light-weight type of pallet developed by Johns-Manville particularly for drying ceramic ware, is made of asbestos fibre bonded with an inorganic binder. Its smooth surface and negligible warpage, even under temperatures as high as 500° F., make these pallets especially desirable where accuracy is essential in producing the finished shapes and ware. The material is absorptive and designed to overcome the objectionable warpage and breakage usually experienced in wood and plaster-of-paris mix pallets.

USE—For drying ceramic ware.

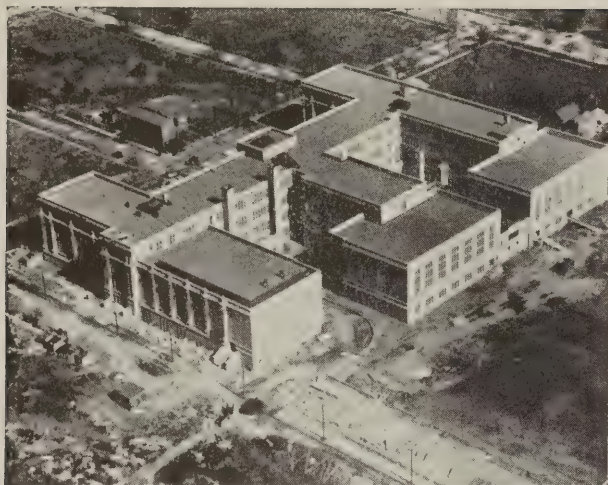
Size	How Furnished
1, 1¼ in.	* In square or rectangular cut pieces to a maximum of 36 x 36 in. and in discs 12 to 36 in. diameters.
	* Discs smaller than 12 in. diameters furnished on special order.

TRANSITE PALLETS

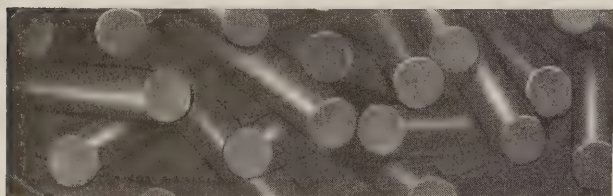
DESCRIPTION—Transite Pallets are smoothly sanded trays of asbestos and cement, specially compounded and treated. They are stronger than Pal-lite but weigh more and are very low in moisture absorption. Transite Pallets are, however, relatively light compared to metal trays and are rustless. The density is about 10 lb. per bd. ft. Aside from weight and absorption, the advantageous characteristics of these two pallet materials are practically identical, including the warpage tolerance of $\frac{1}{64}$ in. per 24 in.

USE—For drying ceramic ware.

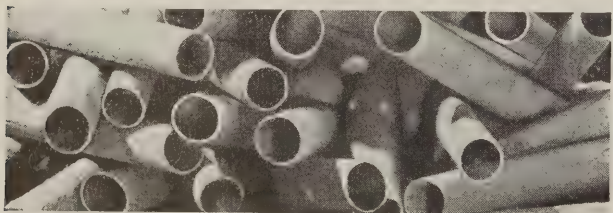
Size	How Furnished
$\frac{1}{4}$ to 1 in. in $\frac{1}{8}$ in. increments, 1¼, 1½, 1¾, 2 in.	* In square or rectangular cut pieces: 6 x 6 in. to 48 x 60 in.
	* Discs furnished on special order.



There is a Johns-Manville Flexstone Built-Up Roof for every roofing condition



Fibres in asbestos roofing are solid. Hence no capillary action is possible, and the asphalt cannot be drawn off by the sun



Fibres in ordinary roofings are tubular. These hollow tubes act as wicks through which the sun draws off the asphalt so essential to the life of the roofing felt

FLEXSTONE BUILT-UP ROOFS

The function of a built-up roofing specification is to insure, under given conditions, full roof protection to a particular building. The materials and methods specified are conditioned by the length of service required, the pitch of the roof deck, and the construction—wood, steel, concrete or gypsum—of the roof deck.

Johns-Manville—with a background of 87 years in the roofing industry—offers a definite specification for any and every roofing requirement.

It is traditional of Johns-Manville to furnish not only proper specifications for existing conditions but also to pioneer in the development of new and improved roofing methods and materials. Perhaps the greatest contribution Johns-Manville has made toward improved roofing practice has been the J-M Flexstone Asbestos smooth-surfaced roof for use on roofs having a pitch of ½ in. or more to the foot.

FLEXSTONE ASBESTOS ROOFS HAVE MANY ADVANTAGES

The Johns-Manville Flexstone Asbestos smooth-surfaced roof is built up in alternate layers of asphalt-saturated asbestos felt and a high grade roofing asphalt. Because the felts are made of asbestos fibre, they will not support combustion. Since asbestos is a mineral, it cannot rot. The result is a fireproof, rotproof, weather-proof and durable roofing

A J-M Flexstone Asbestos roof is a flexible covering of stone. It gives lasting protection from the sun and the weather. Flexstone roofs resist the sun's drying out action because each asbestos fibre is a tiny solid rod as shown in the illustration. Therefore, no capillary action is possible, and it is impossible for the fibre to act as a wick through which the asphalt may be drawn off by the sun.

ANALYSIS CHART FOR JOHNS-MANVILLE FLEXSTONE BUILT-UP ROOFS

ON INCLINES ½ TO 6 IN. PER FOOT

Type of Roof Deck	Roofing	Base Felts			Finishing Felts (All Mopped)		Lb. of Asphalt per Square
		55 lb. Asphalt Saturated Asbestos Felt	No. 45 Asphalt Saturated Rag Felt	No. 30 Asphalt Saturated Rag Felt	No. 15 Asphalt Saturated Rag Felt	15 lb. Asphalt Saturated Asbestos Felt	
Over Wood Decks	Flexstone "Super A"	* 1 (Nail)				3	90
	Flexstone "Standard"	* 1 (Nail)				2	60
	Flexstone "Service"			1 (Nail)		2	60
Over Non-Combustible Decks (Including Nailable Types but Excluding Steel†)	Flexstone "Super A"	1 (Mop)				2	90
	Flexstone "Standard"		1 (Mop)			2	90
	Flexstone "Service"			1 (Mop)		2	90
Over Approved Roof Insulation	Flexstone "Super A"					4	130
	Flexstone "Standard"					3	100
	Flexstone "Service"				1	2	100

*If desired, J-M No. 45 Asphalt Saturated Rag Base Felt may be used instead of J-M 55 lb. Asphalt Saturated Asbestos Felt.

†On steel decks, roof insulation must first be installed.

Industrial Products

ASBESTOS PERFORATED FELTS

Asbestos Felts are applied more quickly and easily than ordinary felts. And, the hazard of blisters is practically eliminated because Johns-Manville Asbestos Felts are perforated. Millions of tiny holes make the felt more flexible, it lays smoother and conforms better to the irregularities of the roof deck. Each perforation serves at a check valve that opens upward. When the felts are laid in hot asphalt, these so-called valves allow trapped air to escape. The hot asphalt "wells up" through the perforations, completely sealing them from below. The subsequent layer of asphalt then seals them from above. No air bubbles remain underneath—bubbles which might later develop into troublesome blisters.

BONDED ROOFING ASPHALT

Johns-Manville uses a selected grade of asphalt which has proved to be superior to ordinary asphalts. Tested in the most modern types of weathering machines, Bonded Roofing Asphalt remained in virtually its original condition after being subjected to alternate cycles of heat, rain and freezing cold equivalent to ten years of actual service. Ordinary asphalts, tested at the same time were found to be seriously impaired in water-proofing effectiveness.

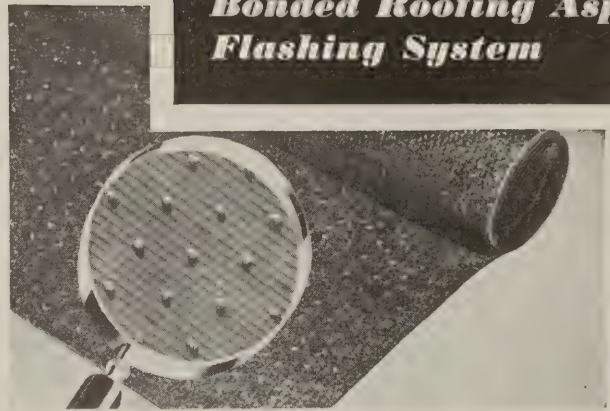
ASBESTILE FLASHING SYSTEM

The Johns-Manville Asbestile system insures proper treatment of flashing area. More than at any other place on the roof, a leak is apt to develop at the junctions formed by the roof deck and vertical surfaces. Since these vertical surfaces are constructed usually of different materials than the roof deck, Johns-Manville has designed two methods of flashing to meet successfully the various conditions encountered: The "Super A" Asbestile Flashing System and the "Standard" Asbestile Flashing System. Specifications for either or both Systems will be furnished on request.

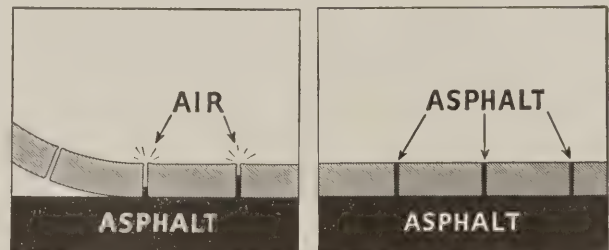
Johns-Manville

BUILT-UP ROOFS

Perforated Felts Bonded Roofing Asphalt Flashing System



Asbestos roofing felts are perforated with numerous small holes, spaced $\frac{1}{2}$ in. apart, which permit the roofing to be laid more quickly and easily, and eliminate the hazard of "blisters"



These two diagrams show how the asphalt "wells up" through the perforations when Johns-Manville Perforated Asbestos Felts are applied

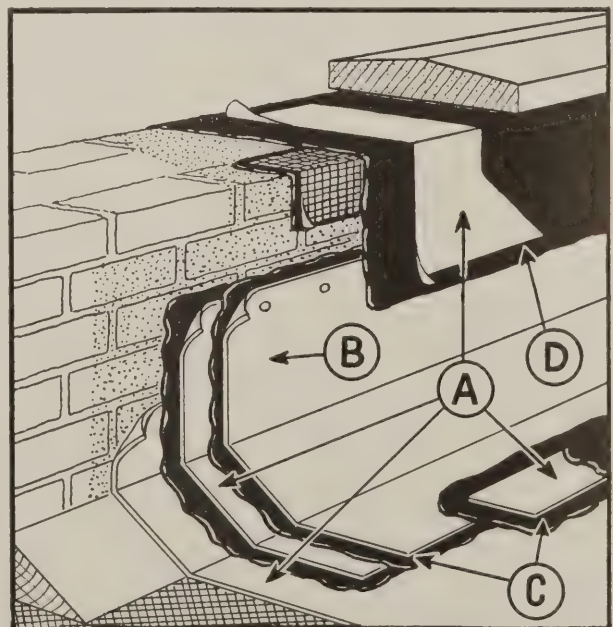


Diagram shows a typical J-M Asbestile through-wall flashing installation. A, represents 15 lb. Asbestos Felt; B, Base Flashing; C, Asphalt; D, Asbestile



J-M Rock Cork is here being installed over a layer of roofing felt. It will then be covered with a J-M Built-Up Roof



Rot, caused by condensation, has destroyed this wood roof deck. This means an expensive repair job



Roof drip, caused by condensation has seriously damaged this ceiling. This could have been prevented by the use of proper roof insulation

FACTS ABOUT ROOF INSULATION

A little more than fifteen years ago roof insulation was considered something of a novelty. But today, more than half of the roof specifications written by architects include insulation. And those who have studied building problems predict that it will become an absolute "must" in the future, regardless of the type of structure.

Roof insulation was originally recommended to architects and building owners by Johns-Manville for two basic purposes—to save fuel and to make the upper floors of the building warmer in winter and cooler in summer. But it became apparent that there were other important advantages.

PROPER ROOF INSULATION HAS MANY ADVANTAGES

Adequate roof insulation prevents condensation on the under side of the roof deck. This eliminates discoloration of ceilings and damage to equipment due to roof drip. It also protects the roof deck against rot and corrosion. It helps prevent concrete decks from cracking because it guards against sudden temperature changes. Roof insulation also provides protection for the roofing felts themselves because it acts as a "cushion" separating the felts from the deck. This reduces the hazard of cracks in the felts due to movement of the deck.

Finally, adequate roof insulation is vital to the efficient operation of air-conditioning systems.

TWO TYPES OF ROOFING INSULATION

Johns-Manville furnishes two types of roofing insulation, J-M Rock Cork and J-M Roofinsul. These insulations are especially designed to receive built-up roofing directly over them. Johns-Manville specifications for their application have been drawn with a great deal of care in order to insure that the insulations will retain their initial efficiency throughout the lifetime of the roof. Specifications call for the insulation to be sealed below and above from moisture which causes loss of efficiency. In addition the insulation is isolated into small areas by "path strippings" of waterproof felts which restricts leak damage to a minimum.

Industrial Products

ROCK CORK ROOF INSULATION

Rock Cork Roof Insulation maintains its efficiency indefinitely. It is made of mineral wool and water-proof binder, surfaced on one side with J-M 15-lb. Asphalt-saturated Felt applied with a high melting point asphalt. Rock Cork Roof Insulation will not rot, support mold or disintegrate. It is non-capillary and will not swell or shrink. At about 85 F. it will sustain evenly distributed loads of 500 lb. per sq. ft. with a compression not exceeding .015 in. per in. of thickness. When laid, the fibrous nature of Rock Cork permits tight joints, and the sheets conform to irregularities in the deck. Rock Cork Roof Insulation sheets are easy to handle and sufficiently strong to be applied with practically no breakage.

Size	Thickness	How Packed	Approx. Weight
Furnished in sheets 18 x 36 in.	1, 1½, and 2 in.	Packed in cartons containing 54, 36 and 27 sq. ft. respectively	per sq. ft., 1 in. thickness, 2.0 lb.; 1½ in. thickness, 2.8 lb.; 2 in. thickness, 3.6 lb.

ROOFINSUL

J-M Roofinsul is a light weight, efficient insulation made of southern pine fibre, interlaced, felted and rolled into boards of the most practical size. In addition to its high insulating value, Roofinsul possesses structural strength and rigidity. It is easily installed and can be cut and nailed in the same manner as wood.

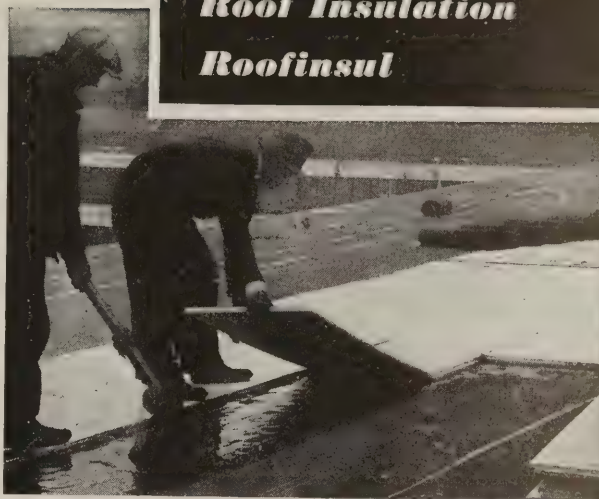
How Furnished	Weight
In sheets 23¾ x 48 in., ½ in. thick, with square edges. Thicknesses of 1, 1½ and 2 in. Also furnished cemented and stapled together with square edges, or with a 1 in. ship-lap joint on all sides.	About 0.75 lb. per sq. ft. ½ in. thick

SPECIFICATION MANUAL

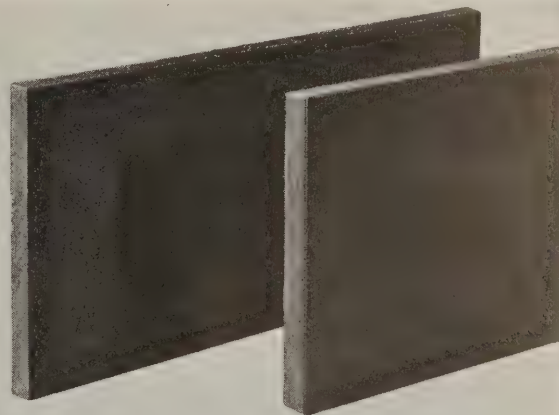
Johns-Manville has prepared a manual giving complete specifications for the application of Johns-Manville Built-Up Roofs on various types of roof decks. It also contains specifications for the application of roof insulation. Send for Brochure BU-51A. This Specification Manual also appears in the current Sweet's Architectural File.

INSULATED ROOFS

Rock Cork Roof Insulation Roofinsul



Here Johns-Manville Roofinsul is being applied. Because of its rigidity, Roofinsul is especially adapted for application on steel decks



Johns-Manville Rock Cork is basically a mineral insulation that cannot rot or decay. It is exceptionally efficient and moisture-resistant. It is felt-sided to provide the ideal felt-to-felt bond with the roof



Johns-Manville Roofinsul is a rigid and structurally strong insulation which provides an efficient, low cost roof insulation for all types of roof decks



For the office reception room, J-M Asphalt Tile combines modern decoration with practical utility and reduced maintenance

INDUSTRIAL FLOORING PLANK

J-M Industrial Flooring Plank is strong, durable, practically wear-proof, resilient, yet capable of supporting heavy loads. Quiet, dustless, vermin-proof and odorless, it will not chip, warp or decay and requires little or no maintenance. It is rapidly and easily applied and ready for use as soon as it is laid.

The plank is a mixture of tough fibre, asphalt and mineral filler, densely compressed and die-cut into rectangular slabs, 12 x 12 in. and 12 x 24 in., in $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. thicknesses. Weight approximately 2 lb. per sq. ft. per $\frac{1}{4}$ in. of thickness.

Available in three colors—red, brown and black—which are integral with the plank. For detailed information, ask for DS Series 110.



Transite Walls are easily and rapidly erected, may be relocated or altered as needs require

ASPHALT TILE FLOORING

Johns-Manville Asphalt Tile Flooring affords a resilient, quiet and attractive floor covering, ideally suited to the modern office or commercial building. It provides a permanently smooth and durable surface, with countless possible color combinations and designs in plain and marbleized colors.

The resiliency of J-M Asphalt Tile makes for quiet foot traffic. It is also a safe floor, because the surface does not wear slippery. It is odorless, non-absorbent and will not originate dust. Barring exceptional abuse, J-M Asphalt Tile Flooring requires no attention or expense for maintenance beyond ordinary cleaning with neutral soap and water.

Furnished $\frac{1}{8}$, $\frac{3}{16}$ and $\frac{1}{4}$ in. thick, in numerous sizes, from 3 x 3 in. to 18 x 24 in.

Johns-Manville Asphalt Tile Flooring is applied by approved contractors situated in all large cities. Consult the nearest J-M office for name of approved applicator in your area.

ACOUSTICAL TREATMENT

For thirty years Johns-Manville has pioneered in the solution of sound control problems. As the result of this continuous program of research and development at its acoustical laboratories, J-M is able to provide a scientifically correct solution to virtually any problem involving the control of sound. This has led to the introduction by Johns-Manville, in the last quarter century, of many distinct and efficient sound control materials, and many techniques and methods have been developed to meet specific needs.

For further information, consult Sweet's Architectural File or write for Brochure AC-31A.

MOVABLE TRANSITE WALLS

Johns-Manville Transite Walls are movable, practically 100% salvageable, easily erected and as easily relocated. They serve as attractive and permanent partitions yet can be rearranged, altered or moved without loss of material.

Transite Walls provide a complete system of "dry wall" construction, including the furring of exterior masonry walls without the usual dirt or dampness, and with minimum interruption of business activity.

Made of asbestos and cement, Transite Walls are fireproof, rot proof and sound resistant and may be decorated if desired. As interior partitions, they may be ceiling high, free standing or railings.

To meet fully the many different requirements of modern offices and industrial plants, Johns-Manville Transite Walls are made in two types—Imperial and Universal—both of which have distinct advantages not found in other movable partitions.

And, J-M Movable Transite Walls now incorporate the newest development of integral coloring with the color inherent in the sheet.

For details, consult Sweets Architectural File or write for Brochure TR-47A.

Transite Conduit

TRANSITE CONDUIT AND TRANSITE KORDUCT

Electrical conduit made of J-M Transite, asbestos fibre and cement, formed into a dense, close grained, homogenous structure combines all the desirable qualities essential to the ideal cable ductway. It is incombustible, immune to electrolysis, unaffected by moisture, heat or frost and highly resistant to the action of soil acids and alkalies.

The material's heat dissipation is rapid enough to permit heavily loaded cables to operate at a temperature lower by several degrees than in any type of organic conduit.

Transite Ducts offer the advantages of increasing the limit current-carrying capacity of the system without additional capital investment; longer cable life through cooler operation; reduced I²R and dielectric losses; non-induction; and high arc-resistance. Since they are composed entirely of inorganic substances, cable burn-outs will not generate smoke, fumes or combustible gases.

Formed on a highly polished steel mandrel, Transite Ducts have a smooth, uniform bore, which, with its low coefficient of friction, permits long cable pulls without undue strain and with no danger of injury to the cable sheath. Tapered ends and couplings insure tight joints with rapid assembly. Its 10 ft. sections afford economy in transportation, handling and installation.

TRANSITE CONDUIT

For use without a concrete envelope

Description—A remarkably strong, light weight, homogeneous and inert material of close grain-structure with a density of approximately 110 lbs. per cu. ft. The conduit has about six times the tensile strength and three times the compressive strength of first quality ordinary concrete. May be stored in the open or under cover and is not affected by weather.

Transite Conduit affords the flexibility and advantages of a single bore conduit, yet is easily assembled in multiples. It may readily be cut, tapered, drilled or machined. Tight joints are assured by the use of tapered sleeve couplings, which are machined to fit snugly over the tapered ends of the conduit sections and fittings. Fittings are made of the same material as the conduit.

Use—As an underground or exposed conduit without a concrete envelope or other protection, where considerable mechanical strength is required.



Made of asbestos fibre and cement, Transite Conduit is approved for use underground without concrete envelope. Both Transite Conduit and its companion product, Transite Korduct help provide lower installation cost and reduced maintenance expense

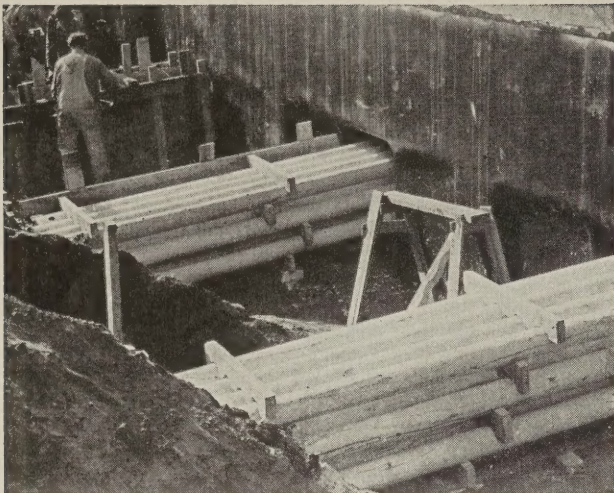
TRANSITE CONDUIT

Size (I.D.), in.	Minimum wall thickness, * in.	Standard length, † ft.	Approximate weight, ** lb. per lin. ft.
2	.35	5	2.0
3	.37	10	3.0
4	.37	10	4.0
5	.40	10	5.5
6	.40	10	6.5

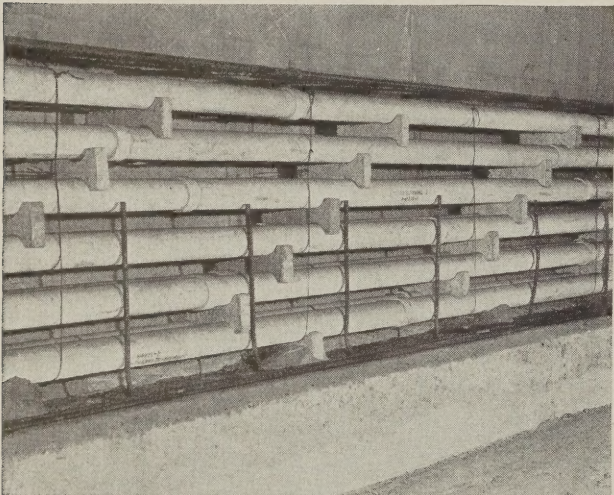
*Tolerance for wall thickness, ± 0.05 in.; for weight $\pm 15\%$.

**The weight shown includes one tapered sleeve coupling per standard length of duct.

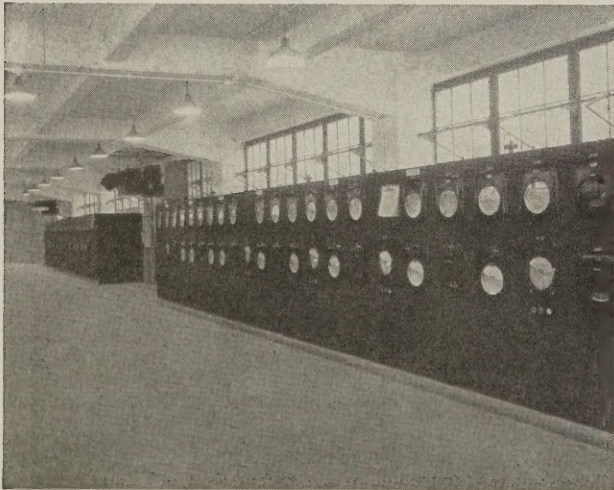
† 2-in. duct may be had in 10-ft. lengths, and 3, 4, 5 and 6-in. duct may be had in 5-ft. lengths, on special order.



Installations such as this are quickly finished, for Transite Korduct is easily handled and assembled



On these communication cables Transite Korduct's light weight and long lengths cut material and installation costs



Asbestos Ebony is an ideal electrical panelling for switchboards, controller plates, switch bases, bus-bar supports, etc.

TRANSITE KORDUCT

For use with a concrete envelope

Transite Korduct combines all of the desirable qualities of a Transite Duct in the lightest usable wall strength. It is identical with Transite Conduit with the single exception of wall thickness and the properties affected by such difference. As a protected duct Transite Korduct has no superior for service and economy.

Due to its strength, this material can be satisfactorily shipped, handled, stored and installed in a concrete envelope. Transite Korduct combines permanence, incombustibility, smoothness of bore and rapid dissipation of heat with economy of installation resulting from light weight and long sections.

In designing duct banks with Transite Korduct, separation between ducts may be reduced to the minimum as the conduit itself is fire-resistant.

USE—For use where ducts must be provided in concrete structures, such as bridges, tunnels, dams, foundations, retaining walls and floors as well as all underground conditions where a concrete envelope is essential.

TRANSITE KORDUCT			
Size (I.D.) in.	Minimum wall thickness,* in.	Standard length,† ft.	Approximate weight,** lb. per lin. ft.
2	.25	5	1.6
3	.27	10	2.1
4	.27	10	2.7
4½	.27	10	3.0
5	.30	10	3.5
6	.30	10	4.3

* Tolerance for wall thickness, ±0.05 in.; for weight, ±15 %.
** The weight shown includes one Harrington (tapered sleeve) coupling per standard length of duct.
† 2-in. duct may be had in 10-ft. lengths and 3, 4, 4½, 5 and 6 in. duct may be had in 5-ft. lengths, on special order.

ASBESTOS EBONY

For electrical mountings

DESCRIPTION—A densely pressed sheet of asbestos fibre and binding cement, impregnated with an insulating compound, and ebony-like in appearance. Because of its structure it will withstand shock and vibration, is unaffected by sudden temperature changes and will not shrink, crack or buckle under severe service conditions. It is impervious to water, oil, gas, and ordinary chemicals.

Its principal characteristics are high dielectric strength, insulation resistance, mechanical strength and durability, although relatively lighter in weight than other materials used for similar purposes.

USE—For switchboard panels, controller plates, switch bases, bus-bar supports and other electrical mountings.

Sizes	How Furnished
⅛ and ⅜ in.	Sheets. 36 x 48 in.
¼ to 2 in.	Sheets: 42 x 48 in, 48 x 48 in. 42 x 96 in, 48 x 96 in.
	Finished panels are available within the above limits.

Korduct, Asbestos Ebony, Sealing Compounds and Other Electrical Products

UNISEAL

All purpose sealing compound

DESCRIPTION—An all purpose, non-slumping compound highly resistant to water, heat and light. Resistant to heat deterioration up to 180 F for continuous periods or intermittent up to 250 F. Can be painted by first using a prime coat of shellac. Completely salvageable. Chemically neutral on lead, metals, and lacquers. Rubber should be primed with varnish or shellac.

USE—For sealing duct and box closures, smoothing mounting surfaces, closing pipe ends, glazing and caulking.

Sizes	How Furnished
1 or 5 lb. wrapped pugs	In unit or in 60-lb. cartons

DUXSEAL

For electrical work

DESCRIPTION—Duxseal is a non-thermoplastic compound which permits expansion and contraction of cables without weakening its sealing properties. Will not slump up to 125 F. Remains workable and plastic at zero. Insoluble in ground waters and unaffected by underground gases or condensates.

USE—Around rubber wire and cables in cellar and manhole entrances, potheads, service boxes and other purposes.

Sizes	How Furnished
1 or 5 lb. wrapped pugs	In unit or in 60-lb cartons

PAKSEAL

For marine and construction fields

DESCRIPTION—A highly water-resistant, weatherproof sealing compound. Unaffected by continuous exposure up to 140 F or intermittent to 200 F. Metals or painted surfaces are not affected by Pakseal. (Where rubber compounds are encountered, use Duxseal or Tranolseal). Can be painted when primed with shellac.

USE—For sealing openings in bulkheads, tube glands and other irregular apertures to prevent the passage of moisture, vermin, gases and other substances.

Sizes	How Furnished
1 or 5 lb. wrapped pugs	In unit or in 60-lb cartons

TRANOLSEAL

For oil exposure

DESCRIPTION—For use against refined oils. Water and vapor-resistant. Unaffected up to 145 F. Will not slump or flow. Can be installed out doors and hand worked at any temperatures where workmen can operate. Will not injure rubber or lead covered cables, metals, or painted surfaces. May be painted without a prime coat.

USE—On transformers, oil switches and like equipment.

Sizes	How Furnished
1 or 5 lb wrapped pugs	In unit or in 60-lb cartons

SPlicing COMPOUNDS

DESCRIPTION—J-M Splicing Compounds are produced from uncured rubber tapes.

USE—For covering wire splices.

Size	How Furnished
3/4 in.	Supplied in rolls in 2 quality grades: Brooklyn & A.S.T.M. (meets A.S.T.M. requirements).

NODRSEAL

For refrigerator use

DESCRIPTION—A non-hardening, adhesive plastic. Remains workable at sub-zero temperatures. Excellent for rapid application where vapor would cause deterioration. Provides an effective odorless seal against water vapor, fumes and numerous gases and condensates. Does not affect metal or painted surfaces. May be painted when a prime coat is used.

USE—For food storage spaces, commercial refrigerators and a wide variety of sealing applications.

Size	How Furnished
11 1/2 lb wrapped pugs	in 70-lb cartons (6 pugs per carton)

NIAGRITE-ASBESTOMENT CABLE FIREPROOFING

DESCRIPTION—A combination of asbestos insulating felt and arc-resistant cement which protects adjacent cables from communicated damage, not only from the arc of a cable breakdown but also from oil or gas fires of long duration. Produces no corrosive action on the cable sheath. Withstands intermittent or continuous immersion in water.

USE—As a fireproofing for electrical cables.

FRICITION TAPES

DESCRIPTION—Woven from selected sheetings, impregnated with an insulating compound and coated with an adhesive rubber composition.

USE—For taping electrical junctions.

Size	How Furnished
3/4 in.	Supplied in rolls in 3 quality grades. Hi-value grade meets A.S.T.M. requirements.

TRANSITE CABLE TRAYS

DESCRIPTION—Made of an incombustible, strong, corrosion-resistant material. Save space, provide greater accessibility, cost less to install. Require no maintenance.

USE—For oil circuit breakers, disconnect switches, potential transformers and low capacity power cables.

Sizes	W.	H.	R.	T.	Length
Tray No. 1	6 in.	1.88 in.	1.5 in.	.32 in.	10 ft.
Tray No. 2	12 in.	2.75 in.	2.0 in.	.32 in.	10 ft.
Tray No. 3	18 in.	3.00 in.	2.0 in.	.32 in.	13 ft.

J-M CHEMSTONE

DESCRIPTION—A tough monolithic material made from asbestos fibre, cement and inert mineral fillers. Integrally mixed with a water, acid and alkali-resisting compound and moulded under pressure into homogeneous sheets.

USE—For table tops, fume hoods, ventilating ducts, etc., and for boxes, vats and pit linings, etc., in paper mills.

TRANCELL

DESCRIPTION—Trancell sheets are large, light weight, strong, and fire-resistant. Conserve space and reduce floor loading. Easily cut and drilled and rapidly erected.

USE—For cell structures, barriers and partitions for housing electrical equipment, such as oil switches, current and potential transformers, disconnecting switches, bus-bars, etc.

Sizes	How Furnished
1/8 to 2 1/4 in.	Sheets: 36 x 96 in., 42 x 96 in., 48 x 96 in.



Johns-Manville

22 EAST 40th STREET, NEW YORK 16, N. Y.

INDUSTRIAL

PRODUCTS

OFFICES

<i>Akron</i>	<i>Grand Rapids</i>	<i>Portland, Ore.</i>
<i>Albany</i>	<i>Honolulu</i>	<i>Providence</i>
<i>Atlanta</i>	<i>Houston</i>	<i>Richmond</i>
<i>Baltimore</i>	<i>Indianapolis</i>	<i>Rochester</i>
<i>Birmingham</i>	<i>Jacksonville</i>	<i>Salt Lake City</i>
<i>Boston</i>	<i>Kansas City, Mo.</i>	<i>San Antonio</i>
<i>Buffalo</i>	<i>Knoxville</i>	<i>San Francisco</i>
<i>Charleston, W. Va.</i>	<i>Los Angeles</i>	<i>Seattle</i>
<i>Charlotte</i>	<i>Louisville</i>	<i>St. Louis</i>
<i>Chicago</i>	<i>Milwaukee</i>	<i>St. Paul</i>
<i>Cincinnati</i>	<i>Minneapolis</i>	<i>South Bend</i>
<i>Cleveland</i>	<i>Newark</i>	<i>Syracuse</i>
<i>Columbus</i>	<i>New Orleans</i>	<i>Toledo</i>
<i>Dallas</i>	<i>New York</i>	<i>Tulsa</i>
<i>Dayton</i>	<i>Oakland</i>	<i>Washington, D. C.</i>
<i>Denver</i>	<i>Omaha</i>	<i>Wheeling</i>
<i>Detroit</i>	<i>Philadelphia</i>	<i>Wilkes-Barre</i>
<i>Erie</i>	<i>Pittsburgh</i>	<i>Youngstown</i>
	<i>Portland, Me.</i>	

CANADIAN JOHNS-MANVILLE CO., LIMITED

<i>Montreal</i>	<i>Vancouver</i>
<i>Toronto</i>	<i>Winnipeg</i>

